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of Illinois  
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**MISSOURI PUBLIC SERVICE COMMISSION**

**File No. EA-2015-0146**

**SURREBUTTAL TESTIMONY**

**OF**

**AARON DEJOIA**

**ON**

**BEHALF OF**

**AMEREN TRANSMISSION COMPANY OF ILLINOIS**

**Keenesburg, Colorado  
November, 2015**

**SURREBUTTAL TESTIMONY**

**OF**

**AARON DEJOIA**

**FILE NO. EA-2015-0146**

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

2           A.     My name is Aaron DeJoia. My business address is: 4626 CR 65, Keenesburg,  
3 Colorado 80643. I am employed by Duraroot, LLC, as a Principal Soil Scientist/Agronomist.

4           **Q.     Please summarize your educational background and professional**  
5 **experience.**

6           A.     I have a Bachelor of Science degree in Agriculture (Agronomy), Secondary  
7 Degree in Natural Resources and Environmental Science and a Master of Science degree in  
8 Agronomy (Soil Fertility) from Kansas State University. I have worked as an environmental  
9 soil scientist since 2000. Currently I am a Principal Soil Scientist/Agronomist with Duraroot,  
10 LLC based in Colorado. A majority of my work since 2004 has been focused on the  
11 reclamation of drastically disturbed lands in agricultural, prime farmland, and  
12 rangeland/pasture settings throughout the United States. I have studied the effects of various  
13 restoration techniques and helped to design and implement successful reclamation plans for  
14 oil and gas exploration pads, pipeline right-of-ways, mines, and roadways. I have particular  
15 expertise in agricultural land and saline/sodic soil restoration.

16           **Q.     What professional credentials do you hold?**

17           A.     I am a Certified Professional Soil Scientist through the Soil Science Society of  
18 America, a Certified Professional Agronomist and a Certified Crop Advisor through the

1 American Society of Agronomy, and a Certified Inspector Sediment and Erosion Control. All  
2 of these certifications require me to take and pass written tests and show education and  
3 professional experience in the chosen industry. I have had to sign ethics pledges for all three  
4 certifications that require me to provide ethical services to my clients and the greater  
5 community. The certifications I currently hold are the highest certifications that can be  
6 obtained for Soil Scientists and Agronomists in the United States. A complete list of my  
7 qualifications and research is attached as **Schedule ADJ-SR1**.

8 **Q. Do you have experience and familiarity with the type of agricultural**  
9 **operations that are conducted in northeast Missouri?**

10 A. Yes. In addition to having grown up in a small, rural community in north  
11 central Kansas that is supported by the local agricultural community, my agricultural studies  
12 furthered my understanding of agriculture and the associated operations. With regard to  
13 northeast Missouri in particular, I have been part of teams that have evaluated and reclaimed  
14 disturbed lands in this region and understand the soils and farming practices of the area.

15 **Q. On whose behalf are you testifying in the current proceeding?**

16 A. I am testifying on behalf of Ameren Transmission Company of Illinois  
17 (“ATXI”) in support of its request for a Certificate of Public Convenience and Necessity  
18 (“CCN”) for a transmission line project in northeast Missouri.

19 **Q. What is the purpose of your surrebuttal testimony?**

20 A. The purpose of my surrebuttal testimony is to respond to the rebuttal  
21 testimony of Charles Kruse and Noel Palmer, both of whom provided testimony on behalf of  
22 Neighbors United Against Ameren’s Power Line (“Neighbors United”), regarding the impact

1 of the Mark Twain Transmission Line Project on agricultural operations, and to respond to  
2 testimony from witnesses at the Commission's local public hearings regarding those matters.

3 **Q. Before you address the specific issues raised, Mr. DeJoia, do you hold the**  
4 **opinion that concerns regarding the impact of the Project on farmland and agricultural**  
5 **operations are alarmist or overly-reactionary?**

6 A. Absolutely not. Many of the issues raised are understandable and necessary  
7 questions that must be answered. Our farmland is our most precious natural resource. It  
8 sustains our way of living, and in doing so, it helps our farmers to feed the world.  
9 Consequently, landowners are right to ask questions and seek the best information available  
10 when it comes to the potential impacts of the Project on their farmland.

11 Recognizing the balance necessary between maintaining agricultural operations and  
12 providing the infrastructure necessary to ensure that the transmission grid meets today's  
13 needs, however, is also important. Construction of the Project will have some impact to the  
14 land; however, it appears from the testimony of ATXI witnesses Doug Brown and David  
15 Endorf that the design of the Project has minimized that impact. It is my opinion that this  
16 impact can be further minimized in ways that will result in minimal impacts on agricultural  
17 operations.

18 **Q. The first issue that Mr. Kruse identifies is the soil compaction caused by**  
19 **the heavy equipment used in construction of the transmission line and "the disregard**  
20 **for wet soil conditions that would make soil compaction much worse." First of all, is soil**  
21 **compaction from construction a valid concern?**

22 A. Anytime you have heavy equipment, whether it is construction equipment or  
23 farm machinery, moving over land, soil compaction will occur to some degree or another

1 and, therefore, is something that needs to be addressed. Moreover, construction of  
2 transmission lines cannot always be completed during optimal site conditions. ATXI's  
3 approach is consistent with the tradeoffs that landowners and tenants make when determining  
4 whether to proceed with farming activities on the land when soil moisture conditions are  
5 suboptimal. This frequently occurs during planting and harvest periods. The landowner or  
6 tenant makes management decisions as to whether to proceed, recognizing there will be  
7 additional costs. Prior to working in these conditions, the landowner/tenant understands that  
8 additional costs may be associated with reclaiming these areas during the next opportunity,  
9 and makes a determination as to whether their need to conduct planting or harvesting  
10 warrants incurring these additional costs. The construction of a transmission line similarly  
11 may result in additional incurred costs for additional reclamation procedures that may be  
12 required when construction is completed during less than optimal times to ensure the soil is  
13 returned to full productive use. However, if a good plan for reclaiming the land utilizing  
14 proper techniques is followed, it has been my experience that a return to productivity of these  
15 sites can be accomplished.

16 **Q. Are you familiar with ATXI's Proposed Standards and Procedures for**  
17 **Construction, Repair and Maintenance of Right-of-Way Mark Twain Project**  
18 **("Standards and Procedures"), which is attached to ATXI witness Doug Brown's**  
19 **surrebuttal testimony as Schedule DBR-SR2?**

20 A. Yes. I have reviewed it, and I understand it to be a proposed set of  
21 requirements that will govern construction, maintenance and repair for the Project.

22 **Q. What does ATXI propose to address the issue of soil compaction?**

1           A.     ATXI specifically addresses the issue of soil compaction in paragraph 15 of

2     **Schedule DBR-SR2:**

3           15.    In order to minimize the impact of soil compaction and rutting, ATXI,  
4                    unless the landowner opts to do the restoration work itself, will deep  
5                    rip to a depth of 18” all cropland, which has been traversed by  
6                    construction equipment, unless the landowner specifies other  
7                    arrangements that are acceptable to ATXI.

8                    ATXI will deep rip to a depth of 12 inches all pasture and hayland that  
9                    has been traversed by construction equipment to alleviate compaction  
10                   impacts, unless the landowner specifies other arrangements that are  
11                   acceptable to ATXI.

12                   ATXI will deep rip or pay to have deep ripped all compacted and  
13                   rutted soil, weather and landowner permitting, after the transmission  
14                   line has been constructed across any affected property.

15           **Q.     Do you have an opinion as to whether the proposed procedures will**  
16     **adequately address concerns related to soil compaction during ATXI’s construction of**  
17     **the line?**

18           A.     Yes. In my opinion, the measures proposed by ATXI are adequate to address  
19     the issue of soil compaction that can occur during line construction. Compaction can be  
20     removed with a deep ripper, thereby returning cropland to its former crop productivity. In  
21     addition, there are additional standards and procedures in **Schedule DBR-SR2** that promote  
22     the return to land productivity. For example, paragraph 6 provides that for non-crop  
23     producing land disturbed during construction, ATXI will restore the land using a native plant  
24     mix utilizing deep-rooted native species to enhance wildlife, soil permeability, and filtering.  
25     The use of the native seed mix will reduce fertilizer, herbicides, irrigation, and mowing  
26     requirements. Should soil issues remain following reclamation efforts, ATXI’s Standards and  
27     Procedures states at page 1 that “[f]ollowing construction, landowners will be contacted to  
28     settle crop, land restoration or other damages.”

1           **Q.     Mr. Kruse next suggests that the transmission line will interfere with**  
2 **irrigation equipment—particularly center pivot irrigation, thereby dramatically**  
3 **diminishing its productivity potential. Do you have that concern?**

4           A.     No. First, according to the testimony of ATXI witnesses Christopher J Wood  
5 and David Endorf, the final route for the transmission line avoids all known fields which use  
6 center pivot irrigation. Consequently, crop productivity will not be impacted because the line  
7 does not interfere with center pivot irrigation. Moreover, other irrigation systems, such as  
8 wheel-lines, flood and traveling guns can be used around transmission lines. According to  
9 Mr. Endorf, spray-type irrigation systems and flood systems typically do not pose a hazard  
10 when located near transmission lines. As Mr. Endorf points out, however, water stream from  
11 gun-type irrigation systems must maintain adequate clearance from transmission line  
12 structures or wires. Those landowners who have concerns about their irrigation systems  
13 should discuss those concerns with ATXI’s designated representative before construction, as  
14 suggested by the Standards and Procedures set out in **Schedule DBR-SR2**. Given the options  
15 available for irrigation, the transmission structures do not preclude a farmer from irrigating  
16 his crops.

17           **Q.     Mr. Kruse asserts in his testimony that the transmission line structures**  
18 **will create hazards for low-level flying and, as a result, prevent the aerial agricultural**  
19 **application to crops and pastures. In addition, Neighbors United witness Noel Palmer**  
20 **testifies that because the area in the right-of-way cannot be treated through aerial**  
21 **application, there will be a loss of approximately 8 to 10 acres of farmland every half**  
22 **mile along the transmission line path. Will the presence of transmission line structures**  
23 **prevent aerial agricultural applications?**

1           A.     Aerial application of herbicides, fungicides, pesticides and fertilizers is a  
2 common practice associated with certain types of farming operations. The presence of an  
3 above-ground electric transmission facility may affect aerial application within or near the  
4 transmission right-of-way. The mere presence of a transmission line in a crop field does not  
5 necessarily prevent aerial application in the entire field, however; after all, aerial agricultural  
6 applications are conducted in many rural agricultural areas that also contain electric  
7 transmission lines. While Mr. Palmer doesn't state the basis for his projection that 8 to 10  
8 acres of cropland will be lost for each half mile of transmission line because of an inability to  
9 conduct aerial applications, the underlying assumption that there is no other method to  
10 provide agricultural applications is, quite simply, not true. In most cases, landowners can  
11 develop an application plan using ground-based application equipment, such as high  
12 clearance spray vehicles, to cover areas no longer suitable for aerial application.  
13 Consequently, it is not true that because a right-of-way area is no longer suitable for aerial  
14 application that the farmland must be taken out of production.

15           Finally, it is my understanding from ATXI witness Doug Brown that ATXI will work  
16 with landowners during easement negotiations to mitigate where practicable the impact of the  
17 transmission line on agricultural operations.

18           **Q.     Do you have an opinion with regard to Mr. Kruse's testimony that the**  
19 **transmission line will have some "adverse effect" on the operation of GPS systems?**

20           A.     I do not. I understand that ATXI witness Mike Silva is an expert in this field  
21 and has addressed this issue.

22           **Q.     Mr. Kruse also testifies that the presence of the monopole structures in**  
23 **agricultural fields will create maneuverability problems for large farm equipment and,**



1 **similarly, will interfere with the use of precision agriculture where the line traverses a**  
2 **field at an angle. Will the presence of the transmission line in fields prohibit farmers**  
3 **from using large farm equipment or from utilizing precision agriculture?**

4 A. According to the testimony of ATXI witness David Endorf, ATXI will design  
5 and construct the transmission line using self-supporting steel monopoles on concrete  
6 foundations that will be about 7-10 feet in diameter and generally 850 feet apart. No guy  
7 wires or anchors are required. While the presence of any utility structure in a field would  
8 require additional maneuverability during agricultural operations, monopole structures are  
9 less intrusive than H-type structures, lattice structures, or structures which require guy wires  
10 or anchors. It is possible that a structure may be located in a field so as to prevent the traverse  
11 of a portion of the field at an angle, but it is unlikely that an entire field would be removed  
12 from production simply because the remaining portions are too small in which to operate  
13 farm equipment or traverse the field at an angle. Based upon my own experience and  
14 familiarity with farming, it is not unusual that a farmer may have a section of ground that is  
15 smaller in size and requires additional care in maneuvering farm equipment. Should a crop  
16 field be made completely unusable because of the line location, the landowner could  
17 certainly assert this claim as part of the loss suffered due to the presence of the easement.

18 **Q. The final issue that Mr. Kruse raises is the impact on agricultural**  
19 **operations and property as the result of toppled structures due to storm damage. Do**  
20 **you have a response to that concern?**

21 A. Although I believe ATXI would respond as promptly as any electric utility  
22 would to repair storm damage, ATXI witness David Endorf will provide ATXI's response in  
23 the event of storm damage to the transmission line.

1           **Q.     Mr. DeJoia, did you review the testimony of witnesses given at the local**  
2 **public hearings sponsored by the Commission?**

3           A.     Yes.

4           **Q.     Were there additional claims regarding the impact of the Project on**  
5 **agricultural operations raised by those witnesses?**

6           A.     Yes. In addition to the concerns that I have already addressed which were also  
7 discussed by witnesses at the local public hearings, there was testimony that the Project  
8 would also impact agricultural operations in the following ways: (1) interfere with existing  
9 terraces, (2) require the cancellation of the landowner's participation in the Conservation  
10 Reserve Program ("CRP"), (3) impact rotational grazing due to inability to use electric fence  
11 chargers, (4) cause the erosion of soils due to destruction of trees and grass in the easement  
12 areas, (5) result in pesticide contamination due to maintenance activities in the easement  
13 areas, (6) dry out corn and soils due to the presence of the transmission line, and (7) cause  
14 loss of or damage to topsoil due to placement of excavated clay soils on crop fields.

15           **Q.     Let's address these in order. Will the transmission line interfere with**  
16 **existing terrace farming?**

17           A.     The installation of transmission lines should not negatively affect the  
18 continued or future use of terraces. The fact that the transmission towers will be placed at  
19 850 foot intervals indicates that the likelihood that the towers will be placed on the terraces is  
20 minimal. If the towers are designed to be placed on a terrace, the landowner should inform  
21 ATXI during easement negotiations so that ATXI may mitigate where practicable the impact  
22 of the transmission towers on terrace maintenance and functionality. Moreover, ATXI has

1 agreed in its Standards and Procedures to restore all disturbed slopes and terraces to their  
2 original condition following construction.

3 **Q. Several witnesses testified that giving an easement for the transmission**  
4 **line on land dedicated to CRP will require them to involuntarily violate their CRP**  
5 **contract and require repayment of all funds received under the program. What is CRP,**  
6 **and what is your understanding of the impact of a utility easement on CRP land?**

7 A. The CRP or Conservation Reserve Program is administered by the USDA  
8 Farm Service Agency (FSA), and was established to preserve wetlands, grasslands, and farmland.  
9 The CRP encourages farmers to convert highly erodible cropland or other environmentally  
10 sensitive acreage to cover for a 10- to 15- year period, and the landowner is paid a per-acre  
11 annual rent and one-half the cost of establishing permanent cover.

12 It is my understanding that the placement of an easement on CRP land does not  
13 automatically result in cancellation of the entire CRP contract, nor does it require repayment  
14 of past funds received by the participant. According to the FSA Handbook governing the  
15 CRP, "CRP land acquired under threat of condemnation or by eminent domain for public use  
16 is considered an involuntary loss of land by the participant," and only that land acquired  
17 under threat of condemnation or eminent domain is removed from the program. In this  
18 situation, the refund of annual rental payments is waived and liquidated damages are not  
19 assessed. It is only where the transmission line would be entirely inconsistent with CRP  
20 objectives that the entire contract would be canceled. Any loss of CRP annual payments for  
21 the land taken out of the program due to an easement for the transmission line would be a  
22 damage suffered by the landowner, for which they would be eligible for compensation as part  
23 of the damage settlement process.

1           Lastly, the Handbook provides that for CRP land temporarily being used by public  
2 utilities for construction of transmission lines, the CRP may be continued without reduction  
3 in payment if the participant gives notice to the FSA and obtains authorization for the use  
4 and, among other things, restores the cover to the disturbed land in a timeframe set by the  
5 FSA. If CRP acreage is disturbed during construction, ATXI will work with the landowner  
6 and the local NRCS office to obtain the parcel's conservation plan (with the landowner's  
7 permission) and ensure that proper seed mix is reestablished in the timeframe outlined.

8           **Q.     Will the presence of the transmission line preclude landowners from**  
9 **relying on electric fencing in order to utilize rotational grazing?**

10          A.     ATXI witness David Endorf discusses electric fencing use and the use of  
11 filters to prevent any issues involved with the presence of transmission lines. Based upon Mr.  
12 Endorf's rebuttal testimony, there is no reason that the landowner could not continue to  
13 utilize rotational grazing.

14          **Q.     Several witnesses at the local public hearings testified regarding their**  
15 **concerns that destruction of trees and grass in the easement areas will increase erosion.**  
16 **Do the proposed Standards and Procedures (Schedule DBR-SR2) address these**  
17 **concerns?**

18          A.     Yes. The Standards and Procedures and standard language in ATXI's Storm  
19 Water Pollution Prevention Plan ("SWPPP") have several provisions which provide  
20 mitigation to possible erosion. Specifically, ATXI agrees to work with landowners to prevent  
21 or correct excessive erosion on all lands disturbed by construction activities and agrees to use  
22 all reasonable efforts to ensure that erosion control measures are implemented. Best  
23 management practices, as described in the SWPPP, will be followed by ATXI to minimize

1 erosion based on the given location's terrain and soil; it provides for the seeding of disturbed  
2 areas to restore permanent cover and the protection of those areas until the permanent cover  
3 is established; and it addresses reclamation of compacted soil. These measures will be  
4 effective in not only reducing the potential for erosion but are also designed to be effective in  
5 elimination of erosion that occurs.

6 **Q. One of the concerns raised at the local public hearings was the potential**  
7 **for pesticide contamination to adjacent lands and crops due to maintenance activities**  
8 **on the easement. Is this a concern?**

9 A. The likely concern would be the use of herbicides, a subset of pesticides, to  
10 control vegetation on the right-of-way. Any place where herbicides are used, they must be  
11 applied with care so as to limit their application to only those intended areas. The Standards  
12 and Procedures also address this concern. Measures that ATXI will take during maintenance  
13 of the right-of-way include giving the landowner prior notice of maintenance activities and  
14 discussing vegetation management with the landowner prior to conducting those activities,  
15 not using herbicides if the landowner does not want herbicides used on their property,  
16 requiring that vegetation line clearance contractors employ a certified arborist as foreman,  
17 and, where herbicides are to be used, using only those registered with the EPA and in strict  
18 compliance with labeling directions. ATXI right-of-way maintenance, including the  
19 application of pesticides and herbicides, will be conducted in compliance with all federal and  
20 state laws.

21 **Q. Mr. DeJoia, one witness at the local public hearing expressed a concern**  
22 **that the presence of the transmission line would dry out nearby corn and soils. Are you**  
23 **aware of this as a potential problem related to transmission lines?**

1           A.     I have never encountered this complaint before, and I am completely unaware  
2 of what mechanism would result in the drying out of corn or soils near the transmission line.  
3 I was also unable to locate any research supporting such a claim.

4           **Q.     The last concern you observed from the local public hearing testimony**  
5 **was related to possible damage to the topsoil of cropland if ATXI were to place on these**  
6 **croplands the clay soils excavated for the concrete foundations. Has ATXI addressed**  
7 **this concern?**

8           A.     Yes. The Standards and Procedures, at paragraph 19, specifically prohibit this  
9 conduct: “ATXI will remove the excess soil material [soil displaced by the concrete  
10 foundations] in tillable and pasture lands.” Even if this provision were not in the Standards  
11 and Procedures, it is clear from the numerous provisions in the Standards and Procedures  
12 related to communication with landowners, as well as the testimony of ATXI witness Doug  
13 Brown, that ATXI would secure the permission of the landowner for any activities occurring  
14 off the easement property. This is not a concern.

15           **Q.     In summary, do you have an opinion as to whether the mitigation efforts**  
16 **outlined in the Standards and Procedures adequately address the concerns raised by**  
17 **Mr. Kruse and the witnesses at the local public hearing?**

18           A.     Yes. The provisions in the Standards and Procedures provide comprehensive  
19 and conscientious strategies that ATXI has established to avoid, minimize or address the  
20 potential impacts of the transmission line on agricultural operations in the affected area.

21           **Q.     Does this conclude your surrebuttal testimony?**

22           A.     Yes, it does.



# AARON J. DEJOIA

Duraroot, LLC  
4686 CR 65  
Keenesburg, CO  
(406) 581-5066

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## Fields of Competence

- Soil Fertility
- Soil and Water Chemistry
- Nutrient Management
- Water, Soil, Plant Interactions
- Saline/Sodic Water/Soil Relations
- Agronomy
- NPDES Permitting
- Irrigation Management
- Soil Characterizations
- Reclamation

## Education

- **M.S. Agronomy (Soil Fertility)** – Kansas State University, Manhattan, KS. Emphasis in soil nutrient movement using GIS and GPS technologies. Thesis topic: Corn response to nitrogen at various locations within a field.
- **B.S. Agriculture** – Kansas State University, Manhattan, KS. Emphasis in agronomy (soil and water science).
- **Secondary Degree Natural Resource and Environmental Science** – Kansas State University, Manhattan, KS.

## Professional Summary

Aaron DeJoia is a board Certified Professional Soil Scientist (#33232), Certified Professional Agronomist (#33232), and Certified Crop Advisor (#33232) with 15 years of experience as a soil science consultant for both international and domestic clients. He currently works as an environmental soil scientist/agronomist providing permitting, operational, reclamation and salinity remediation assistance to varying clients in both the private and public sectors. Mr. DeJoia has served on the National Soils Certification Board and is currently serving on the Council of Soil Science Examiners, 4R Nutrient Management Specialty Certification Committee, and Soil Science Society of America Board of Directors. Mr. DeJoia was also the March, Soils Support Agriculture” International Year of Soil Chairman for the Soil Science Society of America.

Mr. DeJoia’s technical strengths are in soil science, nutrient management, water resources, and agronomy. Mr. DeJoia’s specific technical experience includes reclamation, crop and nutrient management plans, facility water management strategies to manage nutrient and salinity impacts, land application of biosolids, wastewater land application, nutrient cycling, NPDES permitting and soil chemistry. He has particular expertise in the reclamation of pipeline ROWs and oil and gas facilities throughout the United State. Mr. DeJoia has assisted in the reclamation of over 15,000 acres of drastically disturbed lands from New Jersey to Wyoming.

As a technical writer, Mr. DeJoia has been involved in the preparation of several articles, permitting documents, proposals, and refereed journal articles. He has prepared numerous technical project reports for public review. Mr. DeJoia has prepared and presented numerous technical presentations at events including: North Central Extension - Industry Soil Fertility Conference, American Society of Agronomy Annual Meetings, Strategic Research Institute 2002 CBM Water Management Conference, Ground Water Protection Council 2002 Produced Water Conference, 2006 Rocky Mountain Unconventional Gas Conference, 2009 Rawlins BLM Reclamation Conference, 2013 Southern Gas Association Conference. 2014 American Society of Mine Reclamation. In addition Mr. DeJoia has reviewed soil salinity manuscripts for the Journal of Environmental Quality.



## Representative Projects

- **Reclamation Training, Colorado Department of Transportation, Colorado.** Worked with the Colorado Department of Transportation to develop training modules for Project Engineers, Landscape Architects and other environmental professionals. Training modules included both technical aspects of drastically disturbed land reclamation and the implementation of techniques in the field.
- **Agricultural and Land Reclamation Support, Williams, Pennsylvania.** Developed the Agricultural Construction and Monitoring Plan for the 180 mile Atlantic Sunrise project that runs through central Pennsylvania. Worked with Pennsylvania State University, NRCS, and other agencies to ensure that the plan would return agricultural land to full production in a timely fashion. The plan was submitted to the FERC for review and will be implemented during the construction and monitoring phase of the project.
- **Agricultural Permitting Support and Public Utilities Hearings, Dakota Access Pipeline, South Dakota, Iowa, and Illinois.** Assisted the permitting team in preparation of permit documents to address potential agricultural issues throughout the project. Provided written expert rebuttal testimony for South Dakota Public Utility Commission hearings. Met with state agencies to identify potential agricultural issues throughout the alignment and provided technical insights on best management for construction practices.
- **Pipeline Post-Construction Monitoring and Construction, KinderMorgan, Nebraska, Kansas, and Missouri.** Managed all post construction monitoring and construction for approximately 350 miles of right-of-way. Monitoring included storm water, vegetation, and general right-of-way conditions. Performed project management for approximately 20 construction, seeding, and storm water BMP installation crews.
- **Desktop Reclamation Feasibility and Limitation Analysis, Dominion Pipeline, Ohio.** Reviewed and analyzed digital soils data to determine the reclamation feasibility and limitations for soils along a proposed pipeline corridor. Reviewed soil type, prime farmland, coarse fragments and soil depth to determine construction practices required to properly handle the soils to increase reclamation success at the end of the project.
- **Crop Monitoring Protocols, TransCanada, South Dakota.** Developed agricultural crop monitoring protocols for South Dakota. Crops of interest included forage, corn, soybeans, small grains and sunflower. Worked with the NRCS to make sure all issues were addressed and that the crop monitoring protocol would meet their standards.
- **Pipeline Reclamation Expert Witness, KinderMorgan, Indiana.** Provided expert consulting services to KinderMorgan lawyers to determine impacts associated with the installation of a 42 inch pipeline across agricultural lands. Primary complaint was increased compaction due to construction during wet weather. Provided lawyers with an expert report that displayed and interpreted associated soil physiochemical properties at the subject site.
- **Bore Pit Reclamation Study, Alliance Pipeline, Iowa.** Conducted in-depth data collection and analyses on selected property tracts on the Alliance Pipeline. Created recommendations to alleviate poor crop production in areas of previous borehole locations.
- **Problem Tract Consulting, TransCanada, North Dakota.** Reviewed agronomy issues associated with the installation of the Keystone pipeline in northern North Dakota. Prepared report documenting field findings and provided solutions to remedy the identified problems
- **Reclamation Assessment and Planning, Thunder Basin Pipeline, Wyoming.** Reviewed soils conditions for approximately 10 miles of pipeline ROW in central Wyoming to determine reclamation feasibility and design. Prepared report for company and governmental agencies based on the construction practices and soil suitability.
- **ROW Restoration Analysis, Westech, Helena, Montana.** Reviewed soils conditions for approximately 300 miles in Kansas of pipeline ROW to determine compaction mitigation feasibility once construction was

completed. Prepared report for company and governmental agencies based on the desktop analysis performed.

- **ROW Restoration and Agronomic Technical Support, Bison Pipeline, Wyoming, Montana, and North Dakota.** Provided technical support for agronomic, soil and reclamation problems on a 300 mile pipeline. The pipeline crossed three states with varying soils and transected both range and row crop agricultural areas. Developed seed mixtures to both stabilize and reclaim the disturbed ROW.
- **Acid Soil Determination, Sunoco, New Jersey.** Developed and implemented soil testing and evaluation methods for potentially acid producing soils along a 16 mile relocation project in New Jersey. Assisted in negotiations with regulatory agencies and the turnpike authority regarding the testing and identification procedures.
- **Oil and Gas Disturbance Reclamation, Various Clients, Wyoming.** Developed reclamation prescriptions for disturbances associated with oil and gas development. Reclamation prescription included soil salvage planning and reclamation prescriptions intended to enhance reclamation success. Reclamation plans included agronomic principles including tillage, fertilization, and seeding prescriptions.
- **Innovative Reclamation Techniques, Colorado Department of Transportation, Colorado.** Performed literature review of CDOT, other DOT and university reclamation strategies to determine most effective reclamation practices currently in use. Upon completion of the literature review developed field quality control and forensic studies to determine SOP procedures being implemented and past historical success. Literature review and field studies are being used to improve reclamation techniques throughout CDOT.
- **Prime Farmland Evaluation, New Horizon Mine, Colorado.** Performed soils evaluation to determine the reclamation potential of prime farmland in western Colorado. Provided technical soil assistance in preparation of potential legal issues and worked with state and federal agencies to manage future regulatory obstacles.
- **Smooth Bromegrass Salinity Tolerance Literature Review, Williams Production, Wyoming** Conducted a literature review of smooth bromegrass salinity tolerance for submittal to the USDA Soil Salinity Laboratory. During review of smooth brome grass salinity tolerance an error was discovered that incorrectly identified smooth bromegrass as slightly tolerant instead of moderately tolerant. This incorrect labeling of smooth bromegrass salinity tolerance threatened the client's NPDES permit. A white paper was developed and delivered to the head of the USDA salinity laboratory and within 24 hours of receipt the salinity tolerance of smooth bromegrass was officially changed to moderately tolerant.
- **Site Soil Characterization, Various Clients, Alabama, Idaho, Wyoming, Washington, Virginia, New Mexico, and Maryland.** Conducted soil characterizations for land application areas throughout the United States. Described and gathered soil samples from excavated soil pits to determine general soil chemical (salinity and nutrient) and physical properties. Prepared technical reports for clients and regulatory agencies to convey the extent and types of soils within the defined site.
- **Desktop Feasibility Analysis of CBM Produced Water Irrigation, Various Clients, Domestic and International.** Reviewed and analyzed published soil survey and topographical data to estimate CBNG produced water salinity impacts on soil tilth. Implemented GIS data to prepare surface maps showing extent of various soil properties that would impact project feasibility. Prepared reports outlining the scientific and economic feasibility for the use of high salinity and sodic water for irrigation.
- **NPDES Permitting Support, Various Oil and Gas Clients, Wyoming.** Prepared technical portions of the NPDES permits for submittal to the WDEQ. Reports included scientific justification of permit limits and support of the "Ag Use Protection Policy". Responsible for guiding permits through the DEQ and supporting various clients during permit appeals and negotiations. Worked closely with the WDEQ to ensure that all parties were protected and heard during the permitting process.

- **Managed Irrigation of CBNG Produced Water, Various Clients, Wyoming.** Evaluated and monitored the use of CBNG produced water for crop water irrigation and possible effects on soil quality including salinity. Reviewed soil chemistry data to determine expected impacts from irrigation of high sodium produced water. Determined salinity impacts on the physical properties from different types of irrigation techniques including: atomizers, big guns, wheel lines, and pivots. Assessed cropping systems, biomass production, and hay quality associated with CBNG produced water irrigation. Recommended water treatment alternatives to minimize the associated impacts from irrigation of CBNG produced water.
- **NPDES Permitting Support, Meridian Beartrack Mine, Idaho.** Assisted in the preparation and implementation of an NPDES permit. Collected and reviewed data as part of a dye study to determine the mixing zone around the permitted discharge. Reviewed the sampling and quality assurance plans prior to submittal to governmental agencies. Performed a preliminary review of NPDES alternatives including the use of irrigation to manage excess Heap Leach Pad drainage water.
- **Beneficial Use of Industrial Waste Materials, Williams Production, Wyoming.** Determined the suitability of industrial waste materials for use as agricultural amendments for CBNG managed irrigation projects. Conducted waste sulfur oxidation and waste calcium oxide solubility experiments to determine suitability of material for use. Prepared beneficial use statements for the Wyoming Department of Environmental Quality to gain approval for the beneficial use of the industrial waste material.
- **Land Application Site Rehabilitation, Leprino Foods, Nebraska.** Assessed soil, process water quality, and process flow of a Leprino Foods mozzarella cheese manufacturing facility. Determined the sustainability of their current land application facility to manage the expected salt and nutrient loads. Developed an agronomic plan to rehabilitate the land application site while maintaining full facility production. The plan included crop rotation planning, nitrogen treatment, phosphorus management, salinity and sodicity management, soil testing and analysis, geochemical modeling, vadose zone transport, and water balance modeling.
- **Municipal Wastewater Land Application Operations and Monitoring Manual, Kootenai School District, Idaho.** Prepared and submitted an operation and monitoring manual to the Idaho Department of Environmental Quality for the Kootenai School Districts land application facility. Manual included standard operating procedures for the operations of the land application facility, sampling of wastewater, surface water, and groundwater, soil sampling and monitoring, and vegetation monitoring.
- **Evaluation and Design of Subsurface Drip Irrigation System for Produced Water. Yates Petroleum Corporation. Wyoming.** Conducted site assessment and design tasks for an innovative subsurface drip irrigation system to be used to deploy CBNG produced water in accordance with a Class V Underground Injection Control permit.
- **Land Application of Power Plant Blow Down Water, Tenaska Energy, Texas.** Implemented a monitoring and reporting program for land application of cooling tower blow down water. Prepared yearly crop and irrigation management report for submittal to the Texas Commission on Environmental Quality.
- **Irrigation and Crop Management Plans, Various Clients, Alabama, Texas, Washington, Idaho, Illinois, and Maryland.** Prepared and submitted yearly irrigation and crop management plans to clients and regulatory agencies. Plans were prepared to manage process water constituents and maintain crop growth, and protect surface and groundwater environments.
- **Soil Moisture Monitoring Implementation, Various Clients, Washington, Wyoming, Texas, Virginia.** Developed soil moisture monitoring programs for land application facilities that included the use of various soil moisture monitoring devices, including Watermarks, TRIME (Time Domain Reflectometry), and Sentek (Frequency Domain Reflectometry) devices. Programs included installation, monitoring plan preparation, data interpretation, and soil moisture probe calibration.

## Professional Employment History

- 2010 to 2012 and 2013 to Present . Principal Scientist. Duraroot, LLC. Colorado Springs, CO
  - Previously Key Agricultural Services Inc.
- 2013. Senior Project Manager. EPG. Colorado Springs, CO
- 2006 to 2010. Principal Soil Scientist. KC Harvey, Inc. Bozeman, Montana
- 2003 to 2006. Principal Soil Scientist and Partner. KC Harvey, LLC. and DeJoia Consulting Bozeman, Montana.
- 2003 to 2006. Owner. DeJoia Consulting, Inc. Bozeman, Montana
- 2001 to 2003. Project Soil Scientist. Cascade Earth Sciences. Spokane, Washington.
- 2000 to 2001. Project Soil Scientist. Land Profile, Inc. Yakima, Washington.
- 1998 to 2000. Research Assistant. Kansas State University, Department of Agronomy.

## Publications

- Duncan, M.M. and A.J. DeJoia, 2011. Topsoil Loss: Evaluating Agronomic Characteristics of Surface Soils on a Pipeline Right-of-Way. American Society of Reclamation Annual Conference, Bismarck, ND
- Cameron, D.P., K.C. Harvey and A.J. DeJoia. 2009. CBNG Produced Water Reservoir Reclamation Strategies in the Powder River Basin of Wyoming. 16th International Petroleum Environmental Conference. Houston TX.
- Norvell, K,L., K.C. Harvey, D.E. Brown, A.J. DeJoia, and A. J. Bembenek. 2009. Land Application of Coalbed Methane Produced Water: Changes in Soil Chemistry through Time. American Society of Reclamation Annual Conference, Billings, MT
- Harvey, K.C., D.E. Brown, A.J. DeJoia, and A.J. Bembenek. 2007. Managed Irrigation with Coalbed Natural Gas Produced Water: Science-based Planning, Design, Operation, Monitoring and Closure. *In* 2007 Annual Meeting Abstracts SSSA, Madison, WI
- Harvey, K.C., D.E. Brown, and A.J. DeJoia. 2005. Managed Irrigation for the beneficial use of coalbed natural gas produced water in the Powder River Basin. 12th Annual International Petroleum Environmental Conference. Houston TX.
- Schmidt, J.P., A.J. DeJoia, R.B. Ferguson, R.K. Taylor, R.K. Young, and J.L. Havlin. 2002. Corn yield response to nitrogen at multiple in-field locations. *Agronomy Journal* 94:798-806.
- DeJoia, A. J. 2001. Corn Response to Nitrogen at Various Locations within a field. Kansas State University, Masters Thesis.
- DeJoia, A.J., J.P. Schmidt, R.K. Young, and R.K. Taylor. 1999. Small-plot corn experiment to determine N recommendations for site-specific agriculture. 1999 Kansas Fertilizer Research Report. Kansas State University, Manhattan.
- DeJoia, A.J., J.P. Schmidt, R.K. Young, and R.K. Taylor. 1999. Corn yield responses at several locations within a field p. 250. *In* 1999 Annual Meeting Abstracts. ASA, Madison , WI.

DeJoia, A.J., R.K. Young, J.P. Schmidt, and R.K. Taylor. 1998. Nitrogen management in irrigated corn using remotely-sensed imagery and small-plot experiments. In Proceedings of the 28th North Central Extension - Industry Soil Fertility Conference, St. Louis, MO. 11-12 November, 1998

### **Additional Information**

- **Member:** Soil Science Society of America and Agronomy Society of America
- **Member:** Council of Soil Science Examiners and Soil Science Society of America Board of Directors
- **Past Chair:** Soil Science Society of America – Irrrometer Professional Soil Scientist Award
- **Past Chair:** Soil Science Certification Committee, and member of ethics committee
- **Past Chair:** 2015 International Year of Soil March Theme “Soils Support Agriculture” for SSSA