BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

IN THE MATTER OF THE APPLICATION OF	)	
TRI-STATE GENERATION AND TRANSMISSION	)	
ASSOCIATION, INC. FOR A CERTIFICATE OF	)	
PUBLIC CONVENIENCE AND NECESSITY FOR	)	**DOCKET NO. ____**
THE SAN LUIS VALLEY-CALUMET-COMANCHE	)	
TRANSMISSION PROJECT.	)	

DIRECT TESTIMONY AND EXHIBITS OF ANDREW R. LEONI

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I. INTRODUCTION AND QUALIFICATIONS

Q: PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A: My name is Andrew R. Leoni. My business address is 1100 West 116th Avenue, Westminster, Colorado 80234.

Q: BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A: I am employed by Tri-State Generation and Transmission Association, Inc. ("Tri-State") as Senior Manager, Power System Planning.

Q: ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS DOCKET?

A: I am testifying on behalf of Tri-State, however, I understand that my testimony may also be used in support of Public Service Company of Colorado's ("Public Service") companion CPCN application for this joint project.

Q: HAVE YOU PREPARED A STATEMENT OF YOUR EXPERIENCE AND QUALIFICATIONS?

A: Yes. A statement of my experience and qualifications is attached to my testimony as **Exhibit No. ARL-1**.

Q: PLEASE DESCRIBE BRIEFLY YOUR BACKGROUND AND EXPERIENCE IN THE ELECTRIC UTILITY INDUSTRY.

A: I have over 14 years of experience in the electric utility industry and over 20 years of practical electrical experience. In my present position I am responsible for the planning activities associated with Tri-State's transmission system. Prior to joining Tri-State, I worked for a consulting firm designing and commissioning power plants and substations. I have an undergraduate degree from the United States Merchant Marine Academy and a graduate degree in electrical

engineering from the University of Colorado. I am a registered professional engineer in the state of Colorado.

II. PURPOSE OF TESTIMONY

Q: WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A: The purpose of my testimony is to discuss the purpose and need for the San Luis Valley-Calumet-Comanche Transmission Project (the "Project"). I will describe the components of the Project and how this one project replaces two of Tri-State's previously planned reliability and load serving projects. I will also describe the system studies that have been performed and the evaluation of system alternatives.

III. PROJECT PURPOSE AND NEED

Q. WHAT IS THE PURPOSE OF THE PROJECT THAT IS PROPOSED IN THIS APPLICATION?

A. As I discuss in my testimony, the Project serves two main purposes for Tri-State. Tri-State's primary purpose for the project is to improve the electric service to four of its member distribution cooperatives: San Luis Valley Rural Electric Cooperative ("SLVREC"), San Isabel Electric Association ("SIEA"), Southwestern Electrical Cooperative ("SWEC"), and Springer Electric Cooperative ("SEC"); and to one Network Service Customer, Public Service Company of New Mexico ("PNM"). This single Tri-State – Public Service joint project satisfies the need for two Tri-State reliability and load serving projects. I will describe the two original Tri-State planned projects and then explain how the proposed Project corrects the reliability issues in the area. The secondary purpose for the Project is in

consideration of potential generation resource transfer capability to aid in future Tri-State generation resource additions. In this regard, the Project also supports Public Service's Senate Bill 07-100 requirements.

Q. WHAT WAS TRI-STATE'S INITIAL PLAN TO SERVE THIS AREA AS SET FORTH IN ITS 2008 RULE 3206 FILINGS?

A: Tri-State's 2008 Rule 3206 filing included updates to two previously identified transmission projects. The first project was the "San Luis Valley 230 kV Loop Project" or, alternatively, the "San Luis Valley Electric System Improvement Project" ("SLVESIP"). The SLVESIP consisted of a single-circuit 230 kV transmission line connecting the San Luis Valley and Walsenburg substations (CPCN Required per Commission Decision C03-0707). The second project was the "Boone-Comanche-Stem Beach-Walsenburg 230 kV Line" which also consisted of a single-circuit 230 kV line (CPCN Required per Commission Decision C06-0761).

Q. WHAT WAS THE PURPOSE OF THE SAN LUIS VALLEY 230 KV LOOP PROJECT?

A. The purpose of the San Luis Valley 230 kV Loop Project was to provide looped service to the San Luis Valley in order to avoid voltage collapse and loss of load. The project included a new 230 kV transmission line from San Luis Valley Substation to Walsenburg Substation to form a 230 kV "loop" with existing transmission facilities in the San Luis Valley area.

Q. PLEASE DESCRIBE THE EXISTING TRANSMISSION FACILITIES IN THE SAN LUIS VALLEY AREA.

A. There are currently two high voltage transmission lines into the San Luis Valley. Tri-State and Public Service jointly own a 230 kV line that extends south approximately sixty miles from the Poncha Substation located near Salida, Colorado, to the San Luis Valley Substation located northwest of Alamosa, Colorado. Public Service owns a 115 kV line that runs parallel to the jointly-owned 230 kV line.

Q: ARE THE EXISTING TRANSMISSION FACILITIES ADEQUATE TO PROVIDE RELIABLE ELECTRICAL SERVICE TO TRI-STATE'S MEMBERS IN THE PROJECT AREA?

A: No. The transmission facilities serving Tri-State's Member in this area (SLVREC) have reached their capacity due to growth in residential and irrigation electric loads. As a result, the local transmission system is vulnerable to voltage collapse at times of higher loads, including the irrigation season, in the San Luis Valley. At these times of higher loads, the radial, single-source nature of the existing transmission system does not provide the reliability benefits of looped service.

Q. WHAT DO YOU MEAN BY "THE RADIAL, SINGLE-SOURCE NATURE OF THE EXISTING TRANSMISSION SYSTEM"?

A. The two existing lines that transmit power into the San Luis Valley area are radial lines, that is, they transmit power from one source, Poncha Substation, to the loads in the San Luis Valley. Radial lines do not create a looped system where another source of power can be used as a backup in the event of an outage of the primary source. A new line connecting the San Luis Valley and Walsenburg

Substations would form a 230 kV loop. The second 230 kV line would supply power from a second source, Walsenburg in this case, and improve the reliability of the electric service in the San Luis Valley.

Q: PLEASE EXPLAIN THE VOLTAGE PROBLEM IN THE SAN LUIS VALLEY.

A: Tri-State planning studies have demonstrated that the current transmission system in the San Luis Valley is not adequate to support peak loads in the event of a single contingency outage. These studies indicate that there is a potential for voltage collapse whenever the net San Luis Valley loads exceed 65 MW and the existing Poncha-San Luis Valley 230 kV line is not available. In 2007, the combined Public Service and Tri-State peak loads in the San Luis Valley exceeded 120 MW and average loads exceeded 65 MW over 2,000 hours during the year. If an outage occurs on the 230 kV Poncha-San Luis Valley line, Public Service's 115 kV Poncha-Sargent-San Luis Valley line is not capable of reliably serving load above 65 MW. Therefore, Tri-State Member load must be removed from Public Service's 115 kV transmission line. If the load shedding operation is not successful, then there is a risk that large groups of Public Service customers, in addition to Tri-State customers, will be out of power for an extended period of time until the system can be restored.

Q: WHAT IS THE SIGNIFICANCE OF VOLTAGE COLLAPSE ON THE TRANSMISSION SYSTEM?

A: Voltage collapse results in a total loss of load serving capability in the affected area. It also raises significant public safety concerns when hospitals, water

treatment facilities, emergency responders and other essential services must shift to emergency power sources.

Q. DOES VOLTAGE COLLAPSE OCCUR EVERY TIME LOAD IN THE SAN LUIS VALLEY EXCEEDS 65 MW?

A. No. The conditions for voltage collapse only occur when the loads in the San Luis Valley exceed 65 MW and there is an outage on the 230 kV Poncha-San Luis Valley line. There are also some options for Public Service to use small generators that it owns in the San Luis Valley to provide emergency backup power, but it is not clear that those units could be started in time to prevent voltage collapse.

Q: WHAT OTHER STUDIES HAS TRI-STATE COMPLETED TO SUPPORT ITS CONCLUSION THAT THE PROJECT WILL ALLEVIATE THE RELIABILITY ISSUES IN THE SAN LUIS VALLEY?

A. Tri-State submitted to the Rural Utilities Service (RUS) an evaluation of the alternatives it initially considered as a condition precedent to receiving RUS funding for the "original" San Luis Valley-Walsenburg project. In June, 2008, Tri-State filed the "San Luis Valley Electric System Improvement Project Alternative Evaluation and Macro Corridor Study" (the "AE/MCS") with the RUS. That study contains a review of system alternatives that Tri-State considered to address the problems in the San Luis Valley. The study indicated that the most cost-effective alternative was to connect the San Luis Valley Substation to the Walsenburg Substation with a 230 kV line. The original AE/MCS is attached to the testimony of Tri-State witness Mark Murray (see Exhibit No. MJM-2). The double-circuit

230 kV San Luis Valley-Calumet and the additional 230 kV Calumet-Walsenburg segments replace the need for the 230 kV San Luis Valley–Walsenburg line.

Q. DOES THIS CONCLUDE YOUR DISCUSSION OF TRI-STATE'S ORIGINAL PROJECT TO IMPROVE RELIABILITY IN THE SAN LUIS VALLEY?

A. Yes.

Q. WHAT WAS THE PURPOSE OF THE BOONE-COMANCHE-STEM BEACH-WALSENBURG 230 KV LINE PROJECT?

A. The primary purpose of the Boone-Comanche-Stem Beach-Walsenburg 230 kV line project was to eliminate a remedial action scheme (an automatic protection system that takes action under certain abnormal system conditions) and improve the reliability of the system and Tri-State's ability to serve loads between Pueblo, Colorado and northeastern New Mexico. Those loads are currently served by SIEA, SWEC, SEC, and Tri-State's Network Customer, Public Service Company of New Mexico (PNM). In addition, the project would have facilitated the connection of potential new generation projects in the Walsenburg area.

Q. PLEASE DESCRIBE THE EXISTING MAJOR TRANSMISSION FACILITIES BETWEEN PUEBLO, WALSENBURG, AND NORTHEASTERN NEW MEXICO.

A. There are currently two high-voltage transmission lines owned by Tri-State in the area between Pueblo and Walsenburg. The first line is a single-circuit 230 kV line from Public Service's Comanche Substation to Tri-State's Walsenburg Substation. From Walsenburg Substation another 230 kV line continues south into New Mexico and terminates at Tri-State's 230-115 kV Gladstone Substation. The second line between Pueblo and Walsenburg is a 115 kV line that begins at

the West Station, in Pueblo, continues south to the Stem Beach Substation, and then connects to the 115 kV Walsenburg Substation bus.

Q: PLEASE DESCRIBE THE RELIABILITY ISSUE IN THIS AREA.

A: Currently, if a single outage event occurs on Tri-State's existing Comanche-Walsenburg 230 kV transmission line, the 115 kV West Station-Stem Beach-Walsenburg line overloads. The automatic remedial action scheme immediately trips, i.e. opens, the Walsenburg-Gladstone 230 kV line and mitigates the 115 kV transmission line overload. Tripping the Walsenburg-Gladstone 230 kV line, however, reduces the load serving capability on the 115 kV system in northeast New Mexico forcing Tri-State to shed or remove Member load in northeast New Mexico (i.e., SWEC and SEC) via other automatic protection schemes.

Q: HOW WOULD THE BOONE-COMANCHE-STEM BEACH-WALSENBURG 230 KV LINE HAVE CORRECTED THIS SITUATION?

A: In 2008, Tri-State's system planning engineers finalized the "Boone-Comanche-Stem Beach-Walsenburg 230 kV Line Report". The reliability associated study objectives were to consider transmission solutions capable of reliably serving Member loads and eliminating the Walsenburg-Gladstone 230 kV line remedial action scheme associated with the loss of the Comanche-Walsenburg 230 kV line. Within the study, seven transmission alternatives were considered. The final recommendation was for Tri-State to build a new 230 kV Boone-Comanche-Stem Beach-Walsenburg line. An additional path, electrically parallel to the existing Comanche-Walsenburg 230 kV line, such as Tri-State's originally planned Boone-Comanche-Stem Beach-Walsenburg 230 kV line, would

decrease contingency loading on the 115 kV West Station-Stem Beach-Walsenburg line and eliminate the need for the remedial action scheme. If one of the 230 kV lines from the Pueblo area was out of service, the second 230 kV line would carry the load rather than overloading the 115 kV West Station-Stem Beach-Walsenburg line. Therefore, the Walsenburg to Gladstone line could remain in service and no Member customers would lose electrical service as currently occurs with the remedial action scheme.

Q: WILL ADDING A LINE "ELECTRICALLY PARALLEL TO THE EXISTING COMANCHE-WALSENBURG 230 KV LINE" ELIMINATE THE NEED TO SHED LOADS IN NEW MEXICO?

A: No. Some load in northeast New Mexico will still need to be shed for a Walsenburg-Gladstone 230 kV line outage; however, by eliminating the Comanche-Walsenburg outage remedial action scheme the probability of shedding load is roughly halved.

Q. DOES THIS CONCLUDE YOUR DISCUSSION OF TRI-STATE'S ORIGINAL PROJECT TO IMPROVE RELIABILITY FOR THE AREA SOUTH OF PUEBLO AND INTO NORTHEAST NEW MEXICO?

A. Yes.

Q. PLEASE SUMMARIZE TRI-STATE'S RELIABILITY NEEDS IN THE AREA AND HOW THEY COULD HAVE BEEN MET WITH THE ORIGINAL 230 KV SAN LUIS VALLEY LOOP AND BOONE-COMANCHE-STEM-BEACH-WALSENBURG 230 KV PROJECTS.

A. As outlined in Tri-State witness Joel Bladow's testimony, Tri-State is obligated, on several fronts, to provide reliable transmission service. Under contingency conditions, the San Luis Valley is vulnerable to voltage collapse and the associated loss of load. Similarly, upon loss of the Comanche-Walsenburg 230 kV line, transmission paths are automatically opened, resulting in reduced load serving capability and the direct loss of load in northeast New Mexico. Installing a single-circuit 230 kV line between the Walsenburg and San Luis Valley Substations would eliminate the reliability issues in the San Luis Valley. An additional 230 kV line, electrically parallel to the existing Comanche-Walsenburg 230 kV line, would eliminate the need for the Walsenburg-Gladstone remedial action scheme, thereby improving the load serving capability and reliability for Tri-State's Members SIEA, SWEC, and SEC, and for Tri-State's network service customer, PNM.

Q. WHY IS TRI-STATE CONSIDERING ONE PROJECT TO REPLACE THE TWO DISCUSSED ABOVE?

A. Through joint planning forums and open stakeholder meetings, Tri-State and Public Service saw an opportunity to develop a joint project to meet both companies' objectives at reduced cost. In pursuit of the best alternative, the transmission planning personnel at Tri-State and Public Service studied several alternatives. These studies are described in the San Luis Valley-Calumet-Comanche Transmission Project Study Report (the "Study Report")(see Exhibit No. TWG-2) and discussed in the testimony of Public Service witness Thomas Green.

Q. ARE TRI-STATE'S RELIABILITY NEEDS MET WITH THE PROPOSED SAN LUIS VALLEY-CALUMET-COMANCHE TRANSMISSION PROJECT?

A. Yes.

IV. PROJECT DESCRIPTION

Q: **PLEASE DESCRIBE THE SAN LUIS VALLEY-CALUMET-COMANCHE TRANSMISSION PROJECT.**

The Project is a joint effort with Public Service and involves four components: the construction of a new Calumet Substation and three new transmission line segments. Each transmission segment originates from an existing substation and terminates at the new Calumet Substation, which is located approximately 6 miles north of the Walsenburg Substation on property already owned by Tri-State as shown on the map included in the testimony of Tri-State witness Mark Murray (see Exhibit No. MJM-3).

The first transmission line segment will be a double-circuit 230 kV line extending approximately 95 miles from the San Luis Valley Substation to the new Calumet Substation, and using a single 1272 MCM ACSR conductor per phase.

The second transmission line segment will be a double-circuit 345 kV line extending approximately 45 miles from the new Calumet Substation to Public Service's Comanche Substation, and using two 1272 MCM ACSR conductors per phase.

The third transmission line segment will be a new single-circuit 230 kV line installed on double-circuit structures between the new Calumet Substation and the existing Walsenburg Substation. As with the 230 kV San Luis Valley-

Calumet segment, this segment will use a single 1272 MCM ACSR conductor per phase. This also matches the conductor size of the existing Tri-State 230 kV Comanche-Walsenburg line that will be sectionalized at Calumet Substation as part of this project.

The new Calumet Substation will include two 345-230 kV 560 MVA autotransformers and the associated 230 kV and 345 kV circuit breakers to sectionalize the transmission lines associated with the Project as shown in the one-line diagram included in the testimony of Tri-State witness Stephen Mundorff (see Exhibit No. SAM-3).

Tri-State witness Stephen Mundorff and Public Service witness Danny Pearson provide detailed descriptions of the design features of the Project, as well as the types of conductors and structures that will be used.

V. PROJECT STUDIES AND ALTERNATIVE EVALUATION

Q: WHY IS TRI-STATE PROPOSING THE SAN LUIS VALLEY-CALUMET-COMANCHE TRANSMISSION PROJECT AS THE PREFERRED ALTERNATIVE?

A: The proposed Project will correct and improve Tri-State's reliability and load serving capability in the area, facilitate the interconnection of potential generation resources, and cost less than the two transmission projects originally planned by Tri-State because of cost-sharing with Public Service. The Project also optimizes the required land rights by establishing one transmission line right-of-way to serve both Tri-State's and Public Service's needs.

The preferred alternative was selected for a variety of reasons. First, the Project improves reliability, measured by whether an alternative meets power system planning study criteria. Second, there is consideration of potential generation resource transfer capability to aid in future Tri-State generation additions and Public Service's Senate Bill 07-100 requirements. This capability is measured by the level of simultaneous resource injection capability at Calumet Substation and at San Luis Valley Substation without significant network upgrades. A third factor is overall project cost, which is balanced between incrementally improving the level of resource injection capability and the possibility the required funds could be spent more effectively on other aspects of the Colorado transmission system.

Q: WHAT PROCESS WAS FOLLOWED AND WHAT WERE THE STUDY OBJECTIVES?

A: Public Service witness Thomas Green describes the joint study process and objectives in his direct testimony. The Study Report (Exhibit No. TWG-1) also outlines these items. Mr. Green's testimony describes the studies that have been completed with respect to transmission system improvements in Southern Colorado in general and specifically as they relate to the Project. He also describes the system studies that have been performed and why the Project is the best alternative to meet the needs of both Public Service and Tri-State.

In summary, the study process included:

1. Developing and determining generation injection performance for a benchmark case. Tri-State's original two reliability and load serving projects described previously formed the basis for the benchmark case,

including a single-circuit 230 kV San Luis Valley-Walsenburg line and a single-circuit 230 kV Walsenburg-Stem Beach-Boone line.

2. Developing alternatives and comparing generation injection performance to the benchmark case and verifying reliability needs were met.

3. Comparing reliability performance, potential generation transfer capability, and estimated cost for the alternatives.

Q: WHAT SYSTEM ALTERNATIVES WERE STUDIED?

A: Five different alternatives to the benchmark case were studied. These alternatives are described more fully in the Study Report and are summarized as follows:

Benchmark: San Luis Valley – Walsenburg single-circuit 230 kV; Walsenburg – Stem Beach – Boone single-circuit 230 kV.

Alternative 1 – Preferred Alternative – Proposed Project: San Luis Valley – Calumet double-circuit 230 kV; Calumet – Comanche double-circuit 345 kV and Calumet – Walsenburg single-circuit 230 kV.

Alternative 2: San Luis Valley – Walsenburg double-circuit 230 kV; Walsenburg – Stem Beach – Comanche – Boone single-circuit 230 kV.

Alternative 3: San Luis Valley – Walsenburg single-circuit 230 kV; Walsenburg – Stem Beach – Comanche - Boone single-circuit 230 kV; San Luis Valley – Comanche single-circuit 345 kV.

Alternative 4: San Luis Valley – Calumet double-circuit 230 kV; Calumet – Walsenburg single-circuit 230 kV; Calumet – Comanche single-circuit 345 kV.

Alternative 5: San Luis Valley – Calumet double-circuit 345 kV; Calumet – Comanche double-circuit 345 kV; Calumet – Walsenburg single-circuit 230 kV.

Q: WHICH ALTERNATIVES STUDIED FOR THIS APPLICATION CORRECT THE RELIABILITY ISSUES DESCRIBED EARLIER FOR THE SAN LUIS VALLEY AND WALSENBURG AREAS AND MEET PUBLIC SERVICE'S RESOURCE REQUIREMENTS?

A: The benchmark and all five of the alternatives studied for this CPCN would correct the reliability issues described earlier for the San Luis Valley and would eliminate the Walsenburg-Gladstone remedial action scheme. Alternative 1 and Alternative 5 were determined to be the only two alternatives that met both Tri-State and Public Service requirements.

Q. WHY DID TRI-STATE AND PUBLIC SERVICE SELECT THE PROPOSED PROJECT RATHER THAN ALTERNATIVE 5?

A. The transmission line segments in the Preferred Alternative and Alternative 5 are identical with the exception of the San Luis Valley-Calumet segment. The Preferred Alternative uses a double-circuit 230 kV line between the San Luis Valley and Calumet substations, whereas Alternative 5 has a double-circuit 345 kV line between the San Luis Valley and Calumet substations.

As Mr. Green's testimony summarizes and the Study Report concludes, the proposed Project is the Preferred Alternative since it cost effectively:

1. corrects the reliability issues in the San Luis Valley;
2. eliminates the Comanche-Walsenburg 230 kV remedial action scheme;
3. complies with Colorado SB07-100;

4. accommodates large amounts of generation resource injection well in excess of current or expected requirements, without causing interference on existing electric systems, except as described in Exhibit TWG-1; and

5. facilitates future upgrades in the area to allow additional resources if needed.

Alternative 5, on the other hand, cannot be justified from Tri-State's and Public Service's perspective for the following reasons:

1. A 345 kV line does not significantly increase the resource injection capability for the region;

2. A 345 kV line would require significant additional funds, thereby limiting the companies' ability to support other transmission projects in Colorado; and

3. A 345 kV line would require additional right-of- way.

Q. YOU MENTION THE SIGNIFICANT ADDITIONAL FUNDS REQUIRED AS ONE REASON YOU ARE PROPOSING ALTERNATIVE 1 RATHER THAN ALTERNATIVE 5. WHAT IS THE ESTIMATED ADDITIONAL COST OF ALTERNATIVE 5?

A. We estimate that construction of Alternative 5 will require an additional $54 million dollars. This is nearly one-third of the estimated $180 million total cost of the proposed Project. Part of this additional cost is the estimated 50 feet of right-of-way that would be required on top of the 150 feet right-of-way required for the proposed Project as described in the testimony of Tri-State witnesses Steve

Mundorff and Mark Murray. The balance of the estimated additional cost is associated with equipment, materials, and construction.

Q. FOR THIS ADDITIONAL COST, YOU MENTION THAT ALTERNATIVE 5 DOES NOT OFFER INJECTION CAPABILITY IMPROVEMENTS AS COMPARED TO THE PREFERRED AND PROPOSED PROJECT, ALTERNATIVE 1. BASED ON YOUR JOINT PLANNING STUDIES, WHAT IS THE APPROXIMATE DIFFERENCE BETWEEN THE INJECTION LIMITS ASSOCIATED WITH THE PROPOSED PROJECT AND WITH ALTERNATIVE 5?

A: Study results indicate the simultaneous injection capabilities of Alternative 1 and Alternative 5 are not significantly different.

Q. BASED ON YOUR JOINT PLANNING STUDIES, WHY ARE THE INJECTION LEVELS THE SAME?

A. There is a common misconception that building a transmission line at a higher voltage automatically affords a significantly higher transfer capability. Due to the interconnected nature of the existing electric grid, there are inherent limitations in the transmission system preventing any proposed project from transferring a significantly larger amount of generation out of the study area. As discussed in the Project Report and Mr. Tom Green's direct testimony, the ability to transfer power out of the San Luis Valley is not limited by the proposed 230 kV voltage level of the San Luis Valley-Calumet transmission lines; instead, the transfer potential is limited by Colorado's Front Range and Western transmission systems. In the San Luis Valley, transmission facilities such as Public Service's 115 kV Poncha-San Luis Valley line, 69 kV facilities, and the large transformers

serving the bridge between the multiple voltage levels in the area can limit the injection levels. If the San Luis Valley system limitations are mitigated, as discussed in the Study Report, the limitations "shift" to the Front Range and Western Colorado transmission systems. Study results indicate significant transmission system upgrades may be required in the Pueblo, Colorado Springs, Denver Metro, and Western Colorado areas to increase the transfer potential out of the area. The potential upgrades could include minor modifications or require major improvements including new transmission lines, transformer replacement, re-rating existing lines after raising ground clearances, and complete system voltage conversion. In addition, as noted in the Study Report, additional generation injection in southeast Colorado (Lamar area) routed to Comanche, is expected to decrement the simultaneous injection level of the project since this power must also travel along the Front Range transmission system.

Q. BASED ON YOUR JOINT PLANNING STUDIES, WHAT TRANSMISSION SYSTEM REINFORCEMENTS WOULD INCREASE THE SAN LUIS VALLEY INJECTION CAPABILITY?

A: As mentioned in the Study Report and by Public Service witness Mr. Green, some lower cost and higher cost options exist to better utilize the San Luis Valley – Calumet double-circuit line under contingency conditions in the future. The lower cost options include developing special operating procedures such as, switching current limiting reactors, opening lines, or curtailing generation. Some of the higher cost options would include converting the voltage level of existing

lines, constructing an additional line(s) out of the San Luis Valley, such as a second San Luis Valley – Poncha line (approximately 60 miles).

Q. THE JOINT STUDY REPORT IDENTIFIED THE PONCHA-SARGENT 115 KV LINE AS A PRIMARY LIMITATION TO ADDITIONAL GENERATION INJECTION FOR THE PROJECT AREA. WHAT WOULD YOU EXPECT THE POWER FLOW BASED INJECTION LIMIT FOR THE PROPOSED PROJECT IF THE PONCHA – SARGENT 115 KV LIMITATION WERE REMOVED WITH AN OPERATING PROCEDURE OR LOW COST MITIGATION OPTION?

A: The condition was not studied and, as discussed above, in the Study Report and by Public Service witness Mr. Green, there are many limitations to exporting power from the area. Theoretically, mitigating the Poncha-Sargent 115 kV overload for the 230 kV Poncha-San Luis Valley outage under high San Luis Valley injections would result in an incremental increase of injection level in the San Luis Valley; however, the limitations outside of the San Luis Valley would still exist.

Q. YOU MENTIONED A NEW SAN LUIS VALLEY-PONCHA LINE AS AN ADDITIONAL TRANSMISSION SYSTEM REINFORCEMENT TO INCREASE SAN LUIS VALLEY INJECTION CAPABILITY. WHAT WOULD YOU EXPECT THE POWER FLOW BASED INJECTION LIMIT FOR THE PROPOSED PROJECT IF AN ADDITIONAL 230 KV LINE WAS CONSTRUCTED BETWEEN SAN LUIS VALLEY AND PONCHA?

A: A new 230 kV Poncha-San Luis Valley line would be the fourth 230 kV line in the area and mitigate the limiting Poncha-Sargent 115 kV overload for the 230 kV

Poncha-San Luis Valley outage under high San Luis Valley injections. Assuming appropriate upgrades were completed within the area and improvements made to Pueblo, Colorado Springs and the Denver Metro areas, the additional line may allow approximately 2000 MW.

Q: YOU'VE DISCUSSED THE REASONS PUBLIC SERVICE AND TRI-STATE ARE PURSUING ALTERNATIVE 1 RATHER THAN ALTERNATIVE 5. RATHER THAN OPERATING AT 345 KV INITIALLY AS DESCRIBED IN ALTERNATIVE 5, WOULD YOU RECOMMEND CONSTRUCTING THE SAN LUIS VALLEY–CALUMET LINE TO BE CAPABLE OF 345 KV AND INITIALLY OPERATED AT 230 KV?

A. No. In some situations, building a line at a higher voltage and operating it initially at a lower voltage can be an effective risk mitigation approach. However, the decision to spend the extra capital (estimated at an additional $28 million to construct the San Luis Valley-Calumet line at 345 kV, with an additional $26 million required to operate at 345 kV) for higher voltage capability must also consider whether the voltage conversion will occur within a reasonable time frame as well as the benefits of voltage conversion.

For this Project, Tri-State and Public Service believe that it is unlikely that the proposed Project's capacity will be exceeded within the life expectancy of the Project facilities. If the San Luis Valley injection needs exceed the Project's capacity, several options exist. As mentioned in the Study Report, some low cost options include enacting operating procedures to open lines or curtail generation under contingency conditions. Other more costly options, but expected to be

lower than the costs associated with Alternative 5 include converting the San Luis Valley – Poncha 69 kV lines to 115 kV operation or constructing a new 230 kV line between San Luis Valley and Poncha.

The initial capital cost, remote possibility that the proposed Project's capacity is ever exceeded, and potential operational issues do not justify building the project to be capable of future 345 kV operation. The power flow studies indicate San Luis Valley injection levels are not constrained by the 230 kV San Luis Valley-Calumet segment. Instead, the San Luis Valley and Calumet injections interact and the total is limited by other transmission elements within and beyond the San Luis Valley, including the Walsenburg, Pueblo, Colorado Springs, Denver Metro, and Western Colorado areas. Conceptually, even with significant costly upgrades of the transmission system beyond and including the San Luis Valley area, the Project's 230 kV lines would not be fully utilized. The same is true, of course, for any voltage level above 230 kV. Based on coordinated transmission planning and input received during open stakeholder meetings, neither Tri-State nor Public Service is aware of any technically justified, openly reviewed, long-term resource or load growth studies that justify construction or operation of the San Luis Valley – Calumet transmission line at any voltage above 230 kV

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes.

Exhibit ARL-1

Statement of Qualifications

Andrew Leoni

I have over 14 years of experience in the electric utility industry and over 20 years of practical electrical experience. I joined Tri-State in late 2006. In my present position I am responsible for the planning activities associated with Tri-State's transmission system.

Prior to joining Tri-State, I worked for a consulting firm designing and commissioning power plants and substations. I joined the firm as a Design Engineer and left as the Vice President. While a consultant, I worked on projects for Utilities and Industry associated with detailed substation design, protective relay retrofits, reliability analysis, and maintenance for new and retrofit and rebuild projects 230 kV through 4160 V.

I have modeled, analyzed, and developed settings for many power system protection projects, at the transmission, distribution, and industrial voltage levels. In addition to complete protection engineering work, I also performed field testing and training for microprocessor, solid state, and electromechanical protective relays as well as complete substation commissioning, start-up, and system training.

I have authored or co-authored several papers for IEEE including:

- Some Lessons Learned From Commissioning Substation and Medium Voltage Switchgear Equipment, IEEE PCIC 2000 San Antonio, TX. Reprinted as "Look Before You Leap" in IEEE IAS Applications Magazine.
- Improving Safety and Reliability via Cost Effective Upgrades of Power Systems, IEEE PCIC 2005 Denver, CO. Published in IEEE IAS Transactions.
- Coauthor of other IEEE papers on protective relaying and Marine power system grounding.

I have an undergraduate degree from the United States Merchant Marine Academy and a graduate degree (MEng) in electrical engineering from the University of Colorado. I am a registered professional engineer in the state of Colorado.