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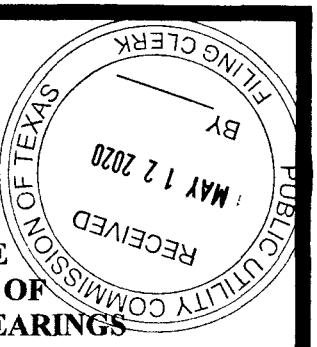


DOCKET NO. 49795
SOAH DOCKET NO. 473-20-1118

COMPLAINT OF PETTY GROUP, LLP AGAINST RIO GRANDE ELECTRIC COOPERATIVE, INC.	**§**	**BEFORE THE STATE OFFICE OF ADMINSTRATIVE HEARINGS**

DIRECT TESTIMONY AND EXHIBITS

OF

ROGELIO ANDRADE

ON BEHALF OF

RIO GRANDE ELECTRIC COOPERATIVE, INC.

May 11, 2020

115

DIRECT TESTIMONY AND EXHIBITS OF
ROGELIO ANDRADE

EXHIBIT LISTING

Exhibits:

DIRECT TESTIMONY AND EXHIBITS OF ROGELIO ANDRADE
ON BEHALF OF
RIO GRANDE ELECTRIC COOPERATIVE, INC.

I. PROFESSIONAL TRAINING AND EXPERIENCE

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Rogelio Andrade. I am employed by Rio Grande Electric Cooperative, Inc. ("RGEC" or "Rio Grande"). My business address is 778 E US Hwy 90, Brackettville, TX 78832.

Q. WHAT IS YOUR PRESENT POSITION?

A. I am the Chief Executive Officer for RGEC.

Q. PLEASE STATE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I currently manage the operations of RGEC. In that position I oversee all operations, including engineering, transmission and distribution system design and maintenance, power supply, rate design, construction management, and customer relations. Prior to becoming CEO of RGEC I worked as the Director of Military and Utility Privatization services for Fort Bliss, Texas. Fort Bliss is a military installation that, from a transmission and distribution standpoint, operates much like a stand-alone utility. I began my tenure with RGEC in 2010 as a contract administrator and worked my way up to my current position. I have completed approximately three years of course work in accounting and finance at University of Texas at El Paso. In addition to that, during my tenure at RGEC, I have received training and certificates from National Rural Electric Cooperative

Association in Management Essentials and the Management Internship Program (MIP) Select. I have also participated in numerous webinars by various associations on topics such as Key Strategic Planning Insights, Investing in Member Engagement, AMI for Smart rate design, Utility Easements, and Line Loss. I have additionally reviewed training materials from PMI on harmonics and metering. RGEC is an active member of NRECA and TEC, which both provide shared best practices for various issues.

Q. **ARE YOU AWARE OF WHETHER NRECA OR TEC OFFER ANY TRAINING ON HARMONICS?**

A. I am not aware of any training offered by neither NRECA nor TEC in relation to harmonics.

II. INTRODUCTION

Q. WOULD YOU PLEASE DESCRIBE THE RETAIL SERVICE AREA AND LOAD SERVED BY RGEC?

A. Yes, RGEC has the largest service territory of any electric cooperative in the contiguous United States, serving 18 counties in Texas and 2 counties in New Mexico, which covers approximately 35,000 sq. miles. These counties include: Brewster, Crockett, Culberson, Dimmit, Edwards, El Paso, Hudspeth, Jeff Davis, Kinney, Maverick, Pecos, Presidio, Reeves, Terrell, Uvalde, Val Verde, Webb and Zavala in Texas, and Eddy and Otero Counties in New Mexico. RGEC currently has approximately 6,690 members with 13,738 meters. It maintains offices in Alpine, Brackettville, Carrizo Springs, Dell City, El Paso, and Fort Stockton, with the Brackettville office serving as corporate headquarters. RGEC maintains 9,946 miles of Energized Line of which 126 miles are Transmission Line, 192 miles are Underground Line, and 9,628 are Overhead Energized Line. RGEC owns and

maintains the electrical distribution systems for Ft. Bliss, El Paso, Texas, and Laughlin Air Force Base, Del Rio, Texas. While RGEC was organized in 1945, the Cooperative's service areas were not officially certificated until 1976 when the PUC was formed. RGEC serves customers in both the Electric Reliability Council of Texas ("ERCOT") and Western Electric Coordinating Council ("WECC"). Retail electric service is provided to residential, commercial, and industrial customers, including oil and gas wells and related facilities throughout its service territory.

Rio Grande operates on a non-profit basis, returning any earnings back to its customers/members/owners in proportion to their patronage with the Cooperative through the form of capital credits. In the last three years the cooperative has returned $3,811,507.00 to members. As a member of the Cooperative, Petty is likewise be entitled to participate in the capital credit allocation and other membership privileges.

Q. WHAT WAS YOUR ASSIGNMENT IN THIS PROCEEDING?

A. My assignment was to review and present certain information relevant to the Complaint and outlined in the Preliminary Order, These issues in general include: (1) the general history and configurations of the substation and electrical line at issue in this case; (2) RGEC's experience with harmonics throughout its system; (3) RGEC's response to harmonics experienced on the electrical line at issue in this case; (4) RGEC's specific response to the issues Petty alleges it experienced in this complaint; and (5) the reasonableness and adequacy of service to Petty.

Q. PLEASE DESCRIBE THE TYPES OF INFORMATION THAT YOU HAVE REVIEWED IN PREPARING YOUR TESTIMONY IN THIS CASE.

A. I have reviewed the direct testimony filed by Petty, as well as pleadings and responses to requests for information ("RFI") submitted in this matter. I have also generally reviewed our internal distribution system in the pertinent area and reviewed data and reports conducted by our consultants on harmonics.

Q. WOULD YOU PLEASE SUMMARIZE THE FACTS AND CONCLUSIONS THAT RESULTED FROM YOUR REVIEW AND ANALYSIS?

A. Yes. As will be discussed in greater detail below, the following facts and conclusions summarize the results of my review and analysis:

- RGEC has stood ready at all times to provide continuous and adequate service to Petty Group LLC ("Petty") (Preliminary Order Issue 1)

- RGEC did not disconnect Petty from the distribution system. Petty was disconnected at its own request. RGEC has stood ready at all times to reconnect Petty at any time.(Preliminary Order Issue 2). Petty is currently connected to the electric distribution system at all meters.

- RGEC has met its obligations under PURA § 38.001 to furnish services, instrumentalities and facilities that are safe, adequate. efficient and reasonable. (Preliminary Order Issue 3)

- The facts that led RGEC to conclude that Petty was emitting excessive current harmonics.(Preliminary Order Issue 8)

- The source of the voltage harmonics on the RGEC system in general and the steps taken to remedy the issue. (Preliminary Order Issues 6 and 9)

- The RGEC tariff provisions that place an affirmative duty on Petty to have facilities or equipment on site to protect against excessive harmonics and other tariff provisions pertinent to this Complaint.(Preliminary Order Issues 10 and 11)

- RGEC's current harmonics reports and system compliance with IEEE 519.(Preliminary Order Issue 12)

III. ELECTRIC COOPERATIVES

Q. PLEASE GENERALLY DESCRIBE HOW ELECTRIC COOPERATIVES WERE FORMED IN THE UNITED STATES.

A. According to the National Rural Electric Cooperative Association, of which RGEC is a member, as late as the mid-1930s, nine out of 10 rural homes were without electric service. The unavailability of electricity in rural areas kept their economies entirely and exclusively dependent on agriculture. Factories and businesses, of course, preferred to locate in cities where electric power was easily acquired. For many years, power companies ignored the rural areas of the nation.[1]

On May 11, 1935, the Rural Electrification Administration (REA) was formed. A year later the Rural Electrification Act was passed. Within months, it was clear that established investor-owned utilities were not interested in using federal loan funds to serve sparely populated rural areas. However, member-owned cooperatives did request significant funding. In 1937, the REA drafted the Electric Cooperative Corporation Act, a model law that states could adopt to enable the formation and operation of not-for-profit, consumer-owned electric cooperatives. Until the formation of electric cooperatives there were lights to the edge of town and darkness beyond.

Electric cooperatives such as RGEC typically have fewer meters per mile than investor-owned utilities. For example, RGEC has an average of only 1.4 meters per mile in its service territory. It is the least densely populated electric cooperative in the United States.

1 https://www.electric.coop/our-organization/history/

The typical cooperative in Texas has 6 meters per mile. Investor-owned utilities have many more meters per mile.

Q. PLEASE DESCRIBE IN GENERAL THE MAKE-UP OF RGEC'S STAFF.

A. The Cooperative was is comprised of the following Departments: Operations & Engineering Support, Technology, Specialized Project Development, Accounting & Finance, and Human Resources & Diversified Services. The total number of employees staffed at the cooperative is approximately 156. The compliment of staff to each position is illustrated on the attached Exhibit A.

Q. **PLEASE SPECIFICALLY DESCRIBE RGEC'S ENGINEERING DEPARTMENT.**

A. The former Engineering Department functions are now staffed between two departments. The bulk of the engineering functions remained within the Specialized Project Development department. This department staffs our Sr. System Engineer. Privatization Systems Analyst, a currently vacant Electrical Engineer position and overseen by our Chief Specialized Project Development Officer, Larry Powell. The Specialized Project Development department performs system planning, including long range plans as well as construction work plans as required by RUS. This department also perform system modeling and analysis, conducts system studies which include: load flow, short circuit/arc-flash, power factor, protective device coordination, distributed generation interconnections and efficiency/system losses. The Engineering support functions are performed by the Engineering Services sub department led by Mike Aguirre, and staffed with (4) staking technicians, with one vacant staking tech position. There is a placeholder for a Land & Surveying Analyst under said sub department. Sr. System Engineer and Chief Specialized

Project Development Officer are supported by various engineering firms that the cooperative retains for various projects and deliverables. The cooperative currently holds active contracts with Electrical Consultants, Inc. and Schneider Engineering.

Q. **WHY DOESN'T RGEC SIMPLY ADD ADDITIONAL ENGINEERS TO ITS STAFF?**

A. The cooperative has actively sought to hire additional Engineering staff but has had difficulty finding candidates willing to relocate to RGEC service territory. As discussed above, RGEC has an open positing for engineering but has not found a qualified candidate. The posting has been open for months. Moreover, it is not efficient to hire additional engineering staff for requirements that either are not common at the cooperative, or do not occur with regularity since this would either result in layoffs as projects/tasks are completed or underutilization of staff which ultimately reflects in the cooperatives rates.

Q. **DO YOU BELIEVE THAT RGEC HAS STAFFED ITS ENGINEERING DEPARTMENT IN A REASONABLE MANNER CONSISTENT WITH HOW OTHER RURAL ELECTRIC COOPERATIVE STAFF THEIR ENGINEERING DEPARTMENT?**

A. Yes.

IV. RGEC DISTRIBUTION FACILITIES IN WEBB COUNTY TEXAS

Q. **WAS RIO GRANDE GIVEN A COMMISSION-APPROVED CERTIFICATE OF CONVENIENCE AND NECESSITY FOR PORTIONS OF DIMMIT AND WEBB COUNTY?**

A. Yes, RGEC's CCN number is 30129. Exhibit B is a map of RGEC's certificated service area in Dimmit and Webb Counties, Texas. The Petty Ranch is served out of the Brundage Substation, which is located in Carrizo Springs, in Dimmit County, Texas. Brundage Feeder 1 serves the Petty Ranch. This line is a186 mile distribution line that runs from on Bermuda Lane, Carrizo Springs, Dimmit County Texas to the farthest point south at just north of the north end of Ranch Road 5234B, Laredo, Webb County, Texas. It is depicted on Exhibit B, as well as the location of the Petty facilities at issue in this case. The Petty Ranch is 36 miles from the substation.

Q. PLEASE DESCRIBE THE CUSTOMERS SERVED OFF OF BRUNDAGE FEEDER ONE.

A. Brundage Feeder 1 serves 104 residential consumers, 40 residential seasonal, 23 irrigation consumers, 69 commercial and industrial ("C&I"), 5 C&I oil wells, 2 C&I under 1000 KW and 6 C&I over 1000 KW.

Q. **PLEASE DESCRIBE THE PETTY FACILITIES AT ISSUE IN THIS PROCEEDING.**

A. At the time Petty made its complaint in this Docket, it was served by 11 meters. One meter has since been consolidated with other facilities. The particular facilities at issue in this case involve [redacted]. [redacted] This meter was served by generator from March 2019 to April 2020. The remaining facilities have received power from the RGEC distribution system with no service quality complaints. Currently Petty is served by RGEC for all of its meters.

[redacted]

Petty described the parameters of the size of the AMP Box it desired. In connection with this request for new facilities, Petty signed a Membership Agreement dated June 18, 2018. The Work Order Payment Agreement was signed by Petty on August 17, 2018 and facilities were completed on or about December 18, 2018. These documents are attached as Exhibit C.

Q. PLEASE DESCRIBE THE OTHER TYPES OF MEMBERS SERVED ON BRUNDAGE FEEDER 1.

A. The member configuration on Brundage Feeder 1 is very similar to other parts of RGEC's service territory. The residential load consists largely of ranching operations, the large power consists primarily of oil and gas activity and the remaining load consists of irrigation, convenience stores, retail, etc.

Q. IS THERE ANYTHING SIGNIFICANT THAT WOULD DISTINGUISH THE BRUNDAGE LINE FROM THESE OTHER LINES?

A. No, while RGEC does have load in more densely populated areas such as Eagle Pass and Del Rio, TX, there are many lines with similar load characteristics to the Brundage Feeder 1. There is nothing significant about this line that would be different from those lines other than the fact that the Brundage line, despite having similar load characteristics, experienced a harmonics issue. RGEC has similar lines to Brundage Feeder 1, throughout the service

territory. Fort Stockton Feeder 2 & 3 are examples of residential, farming and ranching loads that have experienced growth in Commercial & Industrial due to the Permian Basin load growth in Pecos County. RGEC also has typical rural loads that have also a mix of C&I loads similar to Brundage on Van Horn Feeder 1 & 2 which extend into Hudspeth, Culberson, Jeff Davis, and Presidio counties. RGEC has not experienced any harmonic issues on any feeder other than the feeder at issue in this proceeding.

V. HARMONICS

Q. I UNDERSTAND THAT THERE HAS BEEN AN ALLEGATION THAT RGEC EXPERIENCED HARMONICS ISSUES ON ITS BRUNDAGE LINE. COULD YOU EXPLAIN WHAT HARMONICS ARE?

A. While I will defer to our engineering experts for the technical specifics, I do have a general understanding of harmonics. Harmonics are generally voltage irregularities caused by the action of non-linear loads. They can be both on the customer side (current harmonics) or the distribution grid (voltage harmonics) or both. Harmonics are most commonly caused by customers' equipment on the grid rather than any actions or inactions of a utility. When harmonics exceed IEEE 519 standards, they are considered excessive.

Q. DID RGEC EXPERIENCE HARMONICS ON THE BRUNDAGE FEEDER 1?

A. Yes. I am aware of two instances where the issue of harmonics has arisen on Brundage Feeder 1. The first issue was an isolated issue in 2014, when [redacted] discussed certain voltage issues they were experiencing at one of the facilities. RGEC investigated the issue, hired a third party consultant, and determined the source of the problem were

harmonics that were being caused on the [redacted] distribution line. The largest issue appeared to be at the [redacted] site. Accordingly, RGEC worked with [redacted] to correct the problem, which [redacted] timely did. RGEC then hired a second consulting firm, TXUE, to make recommendations as to next steps. One of the recommendations, was that RGEC put customers on notice of their duties to comply with IEEE 519 recommendations. RGEC implemented that recommendation in its tariff on July 2015, which is attached as Exhibit D. Another recommendation was to adopt a new member load survey form. The form suggested to capture and document a load ramp up from the new member. This information seemed repetitive from what was already documented in the new member application form. The information would not have necessarily helped fix the issue of harmonics as it did not capture information on harmonic producing equipment, i.e. VFD, LEDs, etc.

TXUE also recommended that RGEC make all industrial and commercial loads comply with IEEE 519 within a reasonable time, which they believed to be 6 months [redacted] had complied with their IEEE 519 recommendations by the time the TXUE report was received.

Q. AFTER RGEC IMPLEMENTED ITS TARIFF CHANGE AS RECOMMENDED BY TXUE AND REQUIRED [redacted] TO COMPLY WITH IEEE 519 STANDARDS, DID RGEC EXPERIENCE ANY OTHER COMPLAINTS ABOUT VOLTAGE ISSUES FROM HARMONICS OR THAT WERE DETERMINED TO BE HARMONICS RELATED AFTER CHESAPEAKE CORRECTED THE ISSUE?

A. No, RGEC was not on notice of any such issues until approximately Spring 2018 and believed that the problem had been resolved.

Q. WHAT HAPPENED IN 2018 TO LEAD RGEC TO BELIEVE THAT IT MAY AGAIN BE EXPERIENCING AN ISSUE WITH HARMONICS?

A. In the Spring of 2018, RGEC was undergoing a project to implement real time rates or time of use as it also commonly known. As part of that project, certain modifications were being made to its meters. The communications protocol used by these meters is through power line carrier (PLC), which has its limitations. We experienced communication issues with meters across the service territory, but it was prevalent in the Carrizo Springs area. Most of these meters would not communicate the real time data back to RGEC's Advanced Metering Infrastructure (AMI) and Meter Data Management (MDM) system. Investigation was undertaken and the manufacturer of the meters was also consulted to determine the cause of the failure. After much investigation, the manufacturer could not determine the problem and suggested that RGEC consider that it might be harmonics. Around the same time, RGEC had an oil and gas customer contact it with concerns about voltage irregularities.

Q. DID RGEC INVESTIGATE HARMONICS AT THAT TIME?

A. Yes, RGEC promptly sent out a crew with a PMI meter, which measures harmonics, and determined that the oil and gas customer at issue did have issues with harmonics at its site. This customer was emitting harmonics. It was not any action of RGEC. RGEC then hired a third party engineering firm, ECI, to investigate and confirm its findings and make recommendations. ECI recommended sending a letter to the customers on the Brundage

line informing them of the issue and reminding of their duty to comply with IEEE 519. This letter went to all customers on the line, including Petty, in July, 2018.

Q. DID RGEC TAKE ANY FURTHER STEPS WITH RESPECT TO HARMONICS?

A. Yes. RGEC hired Schneider Engineering to conduct a study as to the largest harmonics contributors. RGEC received this report on August 27, 2019. After that time, RGEC continued to monitor loads and began working with customers that were determined to be contributors to obtain compliance. RGEC began monitoring the sites of its 20 largest loads. These included [redacted]

Q. DESCRIBE THE FINDINGS OF SCHNEIDER ENGINEERING.

A. Schneider took measurements at 9 sites: [redacted] All of these sites showed high current THD, which are the harmonics created by their equipment. Of these, [redacted] was identified as a large contributor. The other sites were contributors but at the time of measurement had low loading so it was recommended that RGEC simply monitor these sites because they may not be contributing to the voltage harmonics on the system.

Q. WHAT STEPS DID RGEC TAKE FOLLOWING RECEIPT OF THE SCHNIEDER REPORT TO ADDRESS HARMONICS?

A. RGEC began working directly with each of these contributors. In the case of [redacted], who were thought to the largest contributors, the discussions were taking place directly between myself and the managers and CEO's of these companies in order to elevate the importance of correcting the problem. While the Schneider report showed [redacted] with low loading, RGEC did not feel this was representative of a typical load and therefore continued its focus on [redacted] in accordance of the recommendation to continue monitoring. The results of the continued monitoring exhibited a strong correlation between RMS current and current THD at [redacted]

RGEC also began widescale testing under varying loading conditions, scheduling outages to determine the effect on harmonics with certain facilities off-line and educating these companies on the need for filters or other measures which could reduce harmonics. RGEC also formed a strategic task force with a dedicated project manager to address and monitor this issue. This task force and their activities is discussed in the Direct Testimony of Amber Conrad.

Q, WHAT WAS THE RESULT OF THE DISCUSSIONS WITH THESE COMPANIES?

A. As discussed above, [redacted] were thought to the largest contributors. The response from these companies was slow, albeit understandable. From what I have learned from experts in the field, sourcing and researching this equipment does take time. However, in January 2019, after not receiving an adequate response despite numerous

discussions, RGEC informed [redacted] that it was going to be disconnected from the grid unless a plan was in place. In February 2019, RGEC issued 5 other disconnect/notice of hazardous condition letters. These are attached as Exhibit E.

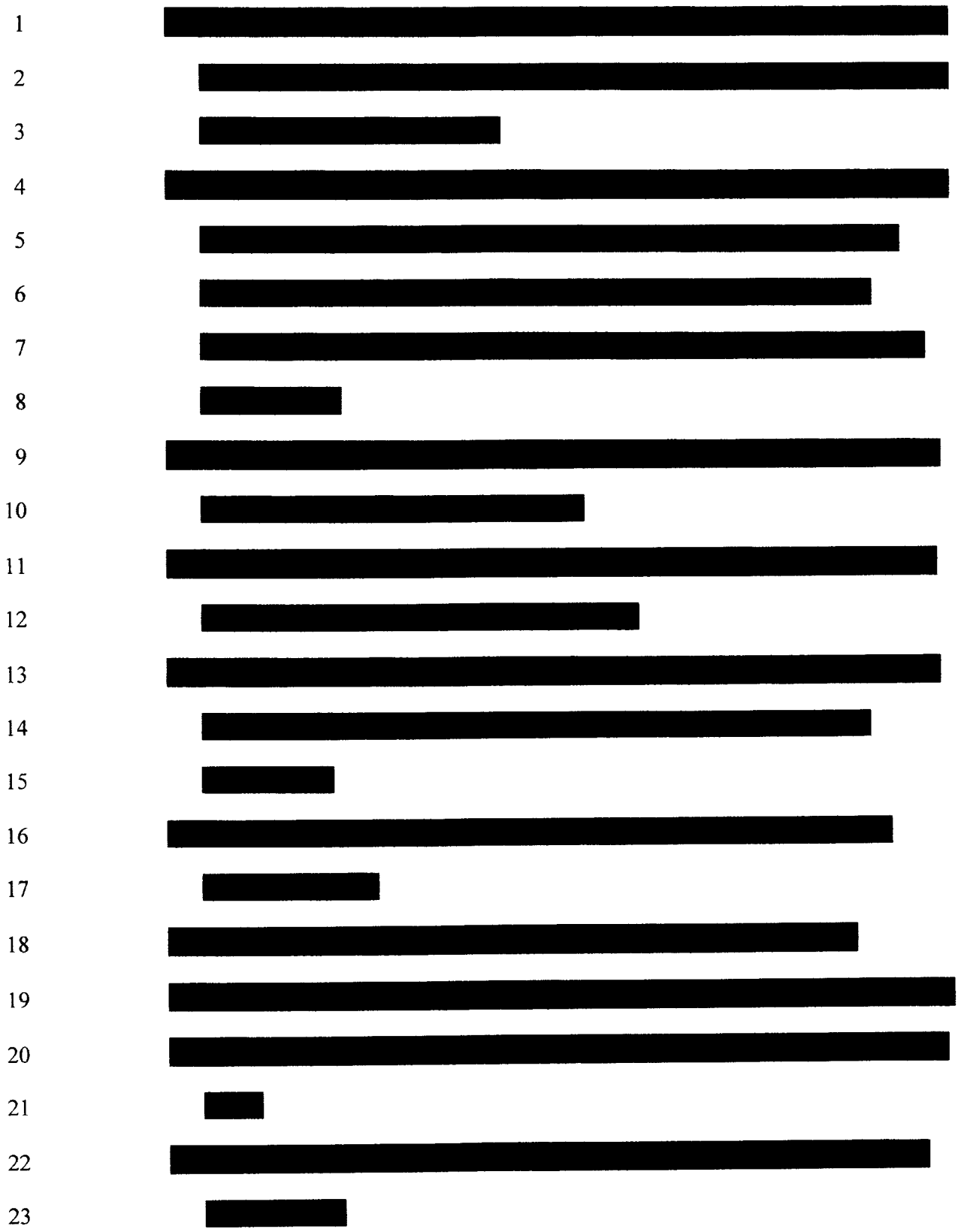
Q. **WHAT WAS THE RESPONSE OF [redacted]**

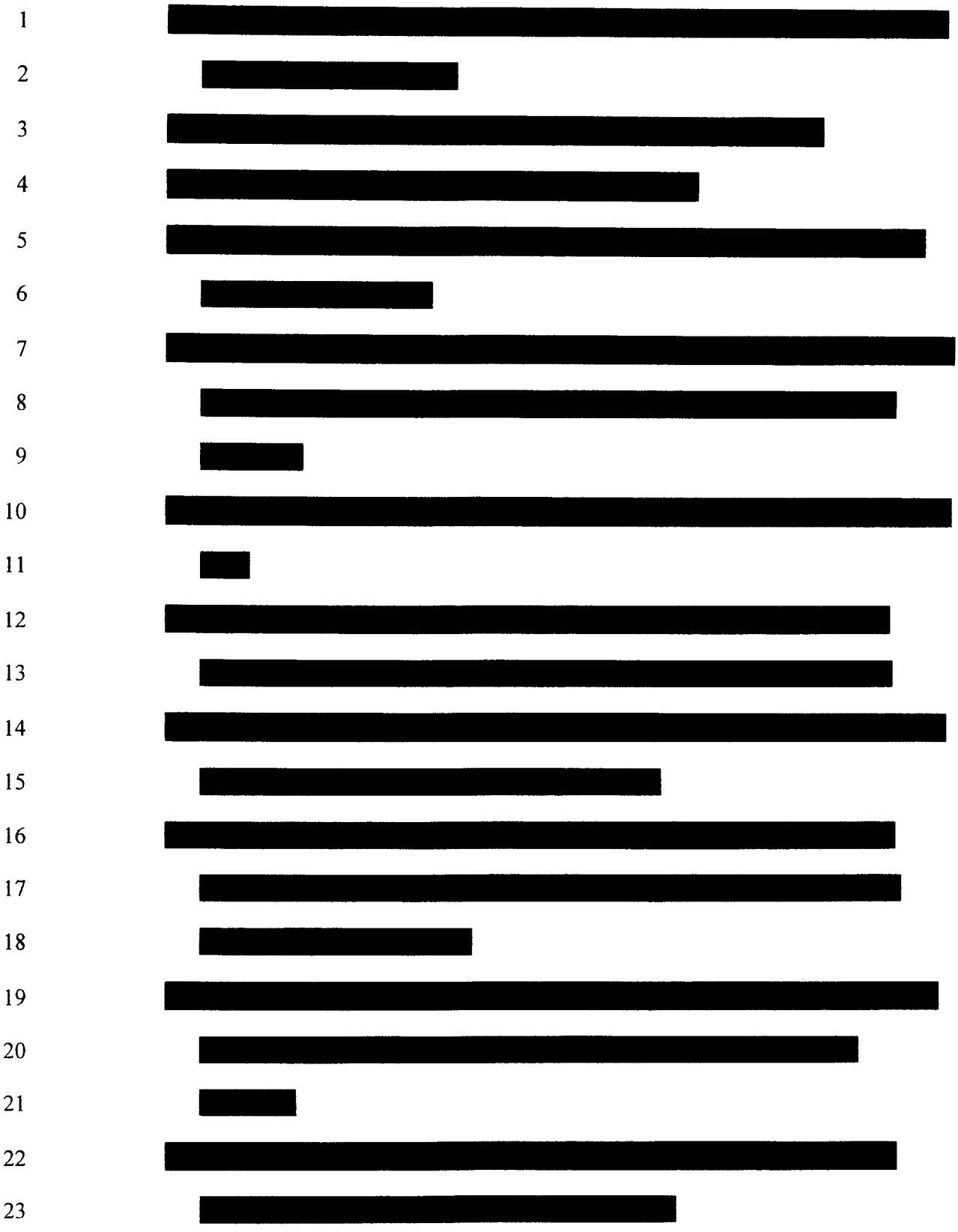
A. [redacted] did additional research and finally informed RGEC that it was not going to install protective equipment until they tested their entire system. For that reason, [redacted] was disconnected from the grid in March 2019 and remains disconnected.

Q. **WHAT WAS THE RESPONSE OF [redacted]?**

A. [redacted] was very responsive and laid out a plan to install filters on February 7, 2019. Throughout 2019, [redacted] did install filters, changed out equipment and took many other measures to correct their current harmonics. During this time, [redacted] would take facilities off the grid for a period of time as well. The following were the steps taken by

[redacted]





Q. WHAT OTHER STEPS DID RGEC TAKE DURING THIS TIME TO MONITOR [redacted]?

A. RGEC monitored [redacted] continually both before and after upgrades. Exhibit F shows over 50 data collections of [redacted]. It should be noted that after upgrades in June, 2019, [redacted] passed inspection for IEEE 519 standards at the [redacted]. See Ex E. Yet, RGEC continued to monitor these sites for compliance.

Q. WAS [redacted] ABLE TO CORRECT ITS HARMONICS ISSUES?

A. Yes, for periods of time [redacted] was found to be in compliance as described above. However, in September 2019, [redacted] did not pass IEEE 519 standards on all of its facilities. For that reason, [redacted] was disconnected from the grid in October 2019 and remained disconnected while they continue to pursue remedies. The following actions took place while tracking the [redacted]

[redacted]

[redacted]

Q. **WHAT OTHER STEPS WAS RGEC TAKING TO ADDRESS HARMONICS IN 2018 AND 2019?**

A. RGEC continued to monitor its twenty largest loads during this time. Several voluntarily took themselves off the grid rather than incur the cost to upgrade equipment and lost run time for repairs. Others were found to be in compliance or, due to the small load, not thought to be contributors to the overall issues. These are outlined in the direct testimony of Amber Conrad.

VI. PETTY

Q. PLEASE BRIEFLY DESCRIBE THE HISTORY OF THE PETTY COMPLAINT IN THIS DOCKET.

A. In late January, 2019. RGEC received a call from Nathanial Morgan, an electrician for Petty regarding power quality at its ranch. Mark Byrom, our Area Operations Manager, was the first point of contact. He visited the Petty Ranch and spoke with Nathanial Morgan. Mr. Morgan indicated that Petty was experiencing "low voltage." The parties discussed both checking grounding and changing out a transformer, both of which were done. Next, RGEC received an email from Kyle Haley, with the Petty Ranch, about power quality issues. A meeting was set up at the Petty Ranch for March 6, 2019. While Kyle Haley was scheduled to attend, he did not. RGEC met with the electricians and tested the lighting fixtures. RGEC did not notice any problems with the lighting. When RGEC asked to see the air condition units running, Petty declined. RGEC then began its normal process of trouble shooting to determine the cause of the alleged issues. Normal trouble shooting for voltage issues always includes the use of a PMI meter, which can also report harmonics.

Q. GENERALLY, WHAT TESTING WAS DONE AT THE PETTY RANCH?

A. While this is more specifically discussed in the timeline of Amber Conrad, RGEC continually monitored and retrieved data from the Petty Ranch from March 6, 2019 until April 24 at the meter. On March 18, 2019, RGEC supplied Petty with a generator so that it could continue to trouble shoot the problems and verify data with its outside engineers. RGEC recorded usage as well as power quality data while the Petty site was on RGEC supplied generator which ran from March 18th 2019 through April 24th 2019. After the

generator responsibility was transferred to Petty and Petty declined to reconnect to grid power, RGEC continued to monitor voltage THD at the Petty point of delivery to document and record the voltage the Petty site would experience while on the grid. This monitoring using a PMI meter lasted from April 2019 through April 2020, approximately a total of 50 data sets were picked up and recorded.

Q. WHAT CONCLUSIONS IF ANY WERE MADE AS A RESULT OF THE TESTING AT THE PETTY RANCH?

A. Analysis of the meter data from March 6 to March 18, 2019 indicated that Petty was emitting current harmonics. This data was analyzed by our in house engineer and validated by our outside engineering firm. RGEC continued to monitor the Petty PMI data and the data revealed the same concerns even after that date. Eventually, after the April 18, 2019 data was retrieved and analyzed and continued to show that Petty was emitting harmonics. RGEC informed Petty that it would no longer supply a generator but would reconnect them to the grid and work with them to correct problems at their location. Petty refused this offer.

Q. **WHY DID RGEC DECIDE TO REMOVE THE GENERATOR AT THE PETTY RANCH?**

A. The decision to transfer the financial responsibility of the generator rental was made taking into account that the data demonstrated that Petty site was generating harmonic levels above IEEE 519 standard. We had been working with other entities that were generating

harmonics and those entities were not provided a generator. As the head of the organization, I did not deem it fair for one entity to be treated different than others, especially at the expense of the rest of the members of the cooperative. Moreover, Petty was the only residential customer that experienced any power quality issues, which lead me to believe, after consultation with engineers, that the source of their problems were not caused by RGEC. In addition, only one other industrial customer experienced problems and it likewise had equipment that was emitting harmonics, like Petty. This customer was not supplied a generator.

Q. **DID RGEC NOTICE THAT THERE WERE VOLTAGE HARMONICS EXPERIENCED AT THE PETTY RANCH.**

A. Yes, RGEC measured both voltage harmonics and current harmonics at the Petty Ranch. These results are summarized in Exhibit B to the Direct Testimony of Amber Conrad.

Q. WHAT ACTIONS DID RGEC TAKE TO CORRECT THIS PROBLEM?

A. As shown in Exhibit B to the Direct Testimony of Amber Conrad, RGEC was undergoing an intensive effort to determine the cause of the harmonics well before the Petty complaint and work with customers to correct the problem. By July 2019 the harmonic conditions at the Petty Ranch were within normal limits.

V. COSTS OF INVESTIGATION AND POWER QUALITY

Q. DID RGEC INCUR COSTS TO INVESTIGATE AND CORRECT THE HARMONICS ISSUS ON BRUNDAGE FEEDER ONE?

A. Yes, RGEC has incurred well over $1,000,000 to investigate and correct the issues. RGEC has not charged any of these costs back to its members.

Q. DO YOU BELIEVE THAT PETTY HAS RECEIVED SAFE, ADEQUATE AND RELIABLE POWER.

A. Yes, while RGEC did experience harmonics on its feeder, we do not believe the cause of any power quality issues for Petty were related to harmonics. As a utility, RGEC cannot control certain issues, it can only work to correct them, which the evidence presented clearly shows RGEC did. There will always be issues that affect an electrical grid, whether it be lightning, storms, bird strikes or, as in this case, customer created issues. In my opinion that does not mean that an electrical utility is not meeting its obligations. Had RGEC simply done nothing to correct the problem, that would be the case. RGEC went above and beyond and was very aggressive in its approach.

Q. IS PETTY CONNECTED TO THE GRID CURRENTLY?

A. Yes. RGEC offered to connect Petty to the grid in April 2019. Petty refused at that time but Petty is currently connected to the grid and RGEC continues to monitor, at its cost, the harmonics at the ranch. The harmomics have been in compliance since July 2019 and continue to remain in compliance.

Q. DOES RGEC HAVE TARIFF PROVISIONS THAT LIMIT LIABILITY?

A. Yes, these are both in the membership agreement and tariff sheets attached as Exhibt D.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

EXHIBIT A

RGEC Organizational Chart

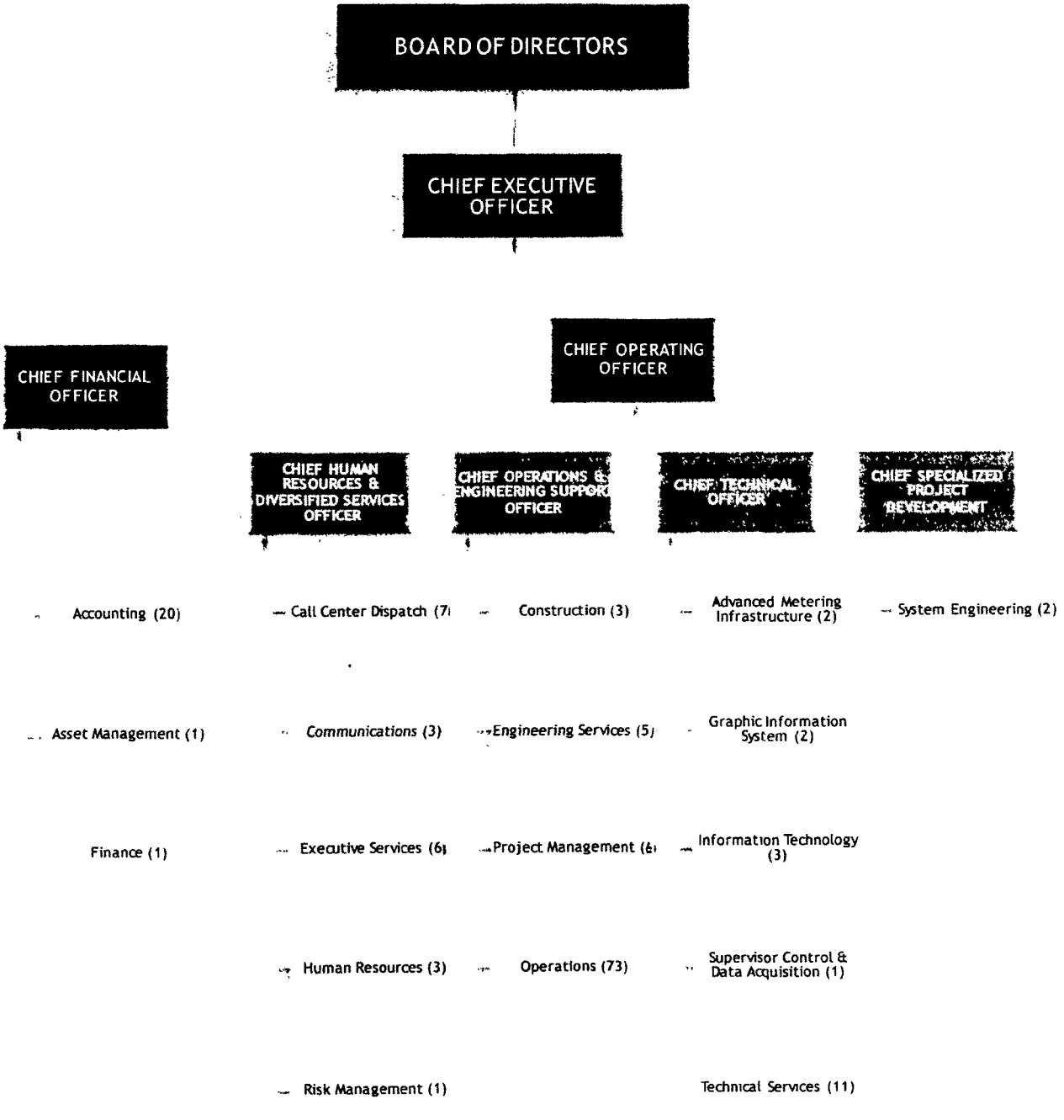


EXHIBIT B

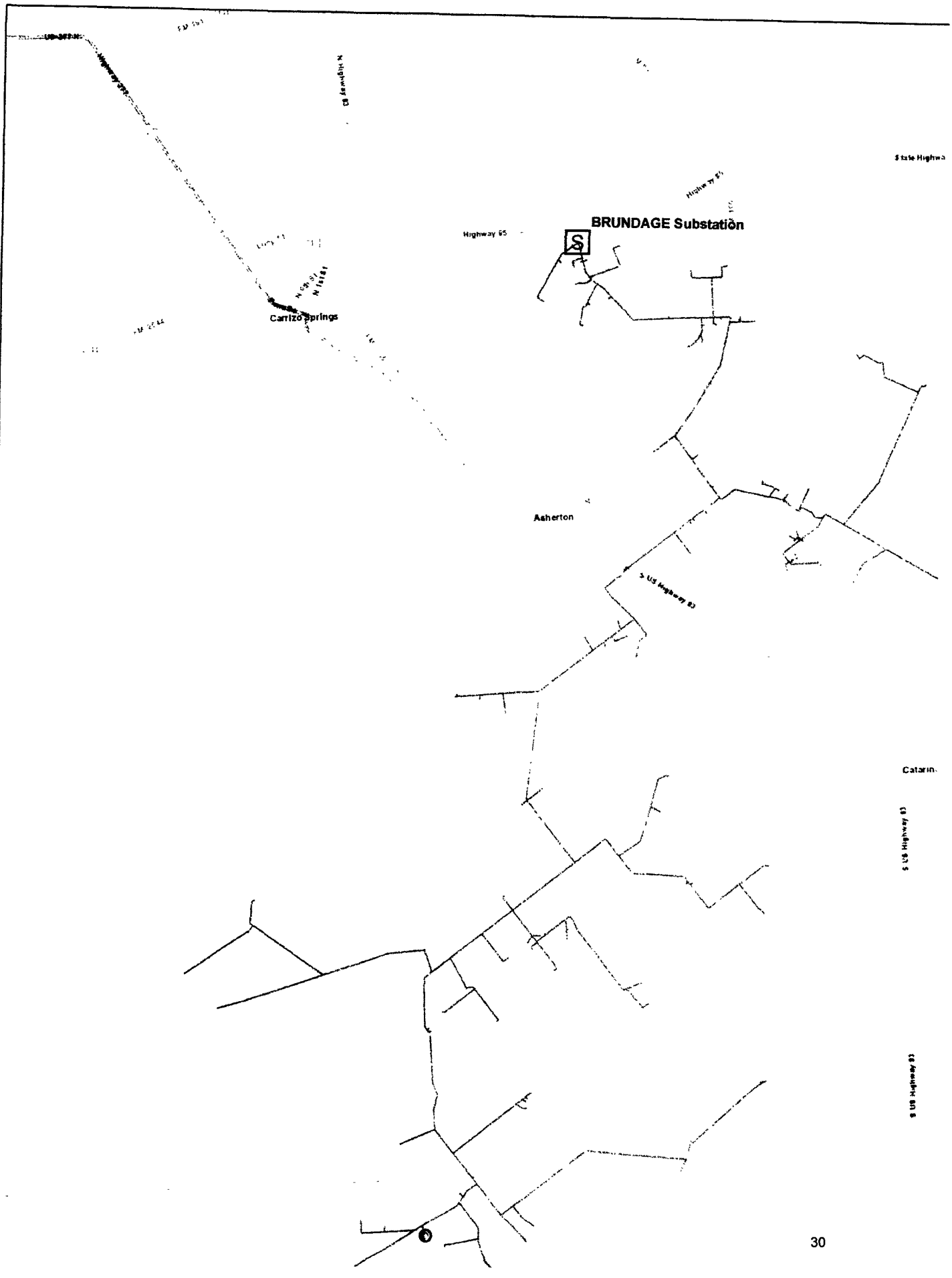

BRUNDAGE Substation
Carrizo Springs
Asherton
Highway 85
S US Highway 83
S US Highway 83
S US Highway 83

EXHIBIT D

323. Consumer's Receipt of Electric Energy.

323.1 Receipt of Electric Energy.

A. Exclusive Use.
When electric service is available, Consumer shall purchase from the Cooperative all electric energy and service required to be used by the Consumer from a single consuming installation.

Consumer may not connect his/her lines to another source of electric energy in a manner that may permit electric energy to flow into Cooperative's system from such source without a written agreement with the Cooperative.

B. Consumer's Installation.
Consumer shall at all times maintain his/her installation in accordance with the latest revision of the National Electrical Code published by the National Fire Protection Association and/or the National Electrical Safety Code published by the Institute of Electrical and Electronics Engineers, Inc., as well as other applicable standards that may be imposed by law, ordinance or regulation.

C. LIABILITY FOR INJURIES AND DAMAGES.
THE COOPERATIVE DOES NOT ASSUME ANY DUTY OF INSPECTING THE CONSUMER'S WIRING, APPARATUS, MACHINERY, OR EQUIPMENT, AND WILL NOT BE RESPONSIBLE THEREFORE. IT IS PARTICULARLY UNDERSTOOD THAT THE CONSUMER ASSUMES FULL RESPONSIBILITY FOR ELECTRIC CURRENT, AND FOR THE WIRES, APPARATUS, AND APPURTENANCES USED IN CONNECTION THEREWITH, UPON CONSUMER'S PREMISES AND FROM THE POINT OF DELIVERY OF POWER IF SUCH POINT IS LOCATED OFF CONSUMER PREMISES, AND WILL PROTECT, INDEMNIFY, AND SAVE COOPERATIVE, ITS DIRECTORS, EMPLOYEES, AND

AGENTS HARMLESS FROM ALL CLAIMS (INCLUDING WITHOUT LIMITATION, ATTORNEYS' FEES AND COSTS OF LITIGATION, WHETHER INCURRED FOR THE COOPERATIVE'S PRIMARY DEFENSE OR FOR THE COOPERATIVE'S ENFORCEMENT OF ITS INDEMNITY RIGHTS HEREUNDER) FOR INJURY, INCLUDING DEATH, OR DAMAGE TO PERSON OR PROPERTY OCCURRING UPON CONSUMER'S PREMISES, OR AT AND FROM SUCH POINT OF DELIVERY, EVEN IF DUE TO COOPERATIVE'S NEGLIGENCE, WHETHER SOLE OR JOINT AND CONCURRENT WITH THE NEGLIGENCE OF CONSUMER OR THIRD PARTIES, OCCASIONED BY SUCH ELECTRIC CURRENT OR WIRES, APPARATUS, OR APPURTENANCES.

323.2 Consumer's Use of Electric Energy.

A. Permitted Uses.
Electric energy provided through Cooperative's facilities shall be used by Consumer exclusively for the purpose or purposes specified in the availability clause of the rate schedule under which Consumer is receiving service and being billed.

B. Resale Prohibited.
Consumer shall not resell electric energy unless specifically provided for in writing by the Cooperative.

C. Uses Prohibited by Law.
Consumer shall not use electric energy for any unlawful purpose or in such a manner that it may endanger life or property.

323.3 Consumer's Electric Load.

A. Load Balance.
Cooperative requires Consumer to control the use of electric energy so that Consumer's electrical load at the point of delivery is in reasonable balance.

B. Allowable Motor Starting.
The following motors may be started across-the-line provided, however, that the Cooperative determines that its facilities are adequate and the frequency of starts are such that other Consumer service will not be adversely affected.

Single Phase	Three Phase
Up to and including 10 Horsepower	Up to and including 100 Horsepower

Larger motors will require motor-starting devices of a type approved by the Cooperative and are to be provided and installed by the Consumer.

Groups of motors starting simultaneously are classified as one motor.

C. Intermittent Electrical Loads.
Consumers with equipment (such as, but not limited to, spot and arc welding machines, x-ray machines, arc-furnaces, elevators, dredges, locomotives, shovels, feed grinders, etc.) whose use of electricity is intermittent and subject to violent fluctuations must be served by a dedicated transformer. Except for individual transformer type arc welders whose rated primary input current does not exceed 15 amperes at 120-volt operation or 30 amperes at 240-volt operation (38 amperes if Consumer is served by an individual transformer), Consumers contemplating the installation of such equipment are to make specific prior arrangements with Cooperative.

D. Equipment Necessary to Limit Adverse Effects.
Cooperative may require Consumer to provide, at Consumer's expense, suitable apparatus to limit the effect of voltage fluctuations caused by electric equipment in Consumer's

installation where Consumer is found to be operating electrical equipment which produces voltage fluctuations, interference, harmonics or distorted wave forms which adversely affect electric service provided by Cooperative to other Consumers.

Consumers utilizing nonlinear loads, such as, but not limited to, adjustable speed drives and uninterruptible power supplies, must employ devices that limit the harmonic voltage and current distortion limits to those set out in IEEE Std 519 5.1 and 5.2.

In lieu of requesting Consumer to install such suitable or special equipment limiting such adverse effect, Cooperative may, at its option, install at Consumer's cost, additional transformer capacity (which may or may not be dedicated solely to such Consumer) or other equipment specially designed to reasonably limit such adverse effect.

E. Voltage and Wave Forms Sensitive Equipment.
A Consumer planning the installation of electric equipment such as, but not limited to, computers, communication equipment, electronic control devices, etc., whose performances may be adversely affected by voltage fluctuations and distorted 60 hertz wave forms is responsible for providing and installing the necessary facilities to limit these adverse effects.

F. Change in Consumer's Electrical Load.
Consumer shall notify Cooperative with reasonable time in advance of any substantial change in Consumer's electrical load. The Cooperative may require information concerning the nature of the load and electric service requirements as well as the expected duration of the load.

If in the judgment of the Cooperative there is an increase in any electric service requirement for which, under standard engineering practice, it would be desirable to construct additional facilities, then the Cooperative may charge in advance as aid to construction

or as an increased minimum a reasonable amount not to exceed the actual cost of such facilities together with the cost of any additional facilities required to be constructed by the Cooperative's wholesale power supplier to service Consumer's load. The Cooperative may require the Consumer to execute a new contract for electric service specifying appropriate terms including the maximum load, increased minimum or aid to construction.

323.4 Power Factor.
If the power factor of the Consumer's load is less than ninety percent (90%), Cooperative may require the Consumer to install appropriate equipment to maintain a power factor of at least ninety (90%) or, at the Consumer's option, to reimburse Cooperative for installing the necessary equipment. See §203.4.

323.5 Access.
Consumer will allow personnel authorized by Cooperative access to Member's premises to inspect, install, remove, or replace Cooperative's property; to read Cooperative's meters, and to perform other activities necessary to provide electric service, including tree trimming and tree removal where such trees in the opinion of Cooperative constitute a hazard to Cooperative's personnel or facilities, or jeopardize the provision of continuous electric service. Refusal on the part of the Consumer to provide reasonable access for the above purposes may, at Cooperative's option, be sufficient cause for discontinuance of service. For the purpose of this section, reasonable access shall include the installation of Cooperative padlocks in all access gates deemed necessary by Cooperative personnel.

323.6 Protection of Cooperative's Facilities on Consumer's Premises.
Consumer shall use reasonable diligence to protect Cooperative's personnel and facilities on Consumer's premises.

In the event of loss of, or damage to, Cooperative's facilities on Consumer's premises caused by or arising out of carelessness, neglect, or misuse by the Consumer or unauthorized persons, Cooperative may require the Consumer to reimburse the Cooperative the full cost for such damage.

when actually received if delivered by courier, overnight mail or personal delivery, or (iii) three (3) days after deposit in the United States mail, if sent by first class mail.
Notices and other communications by Consumer to Seller shall be addressed to:

CEO
Rio Grande Electric Cooperative
HWY 90 and SH 131
Brackettville, TX 78832
Phone: (830) 563-2444
Facsimile: (830) 563-2450

Notices and other communications by Seller to Consumer shall be addressed to:

Any Party may change its representative by written notice to the other Parties.

9.2 Authority of Representative

The Parties' representatives designated in Section 9.1 shall have full authority to act for their respective principals in all technical matters relating to the performance of this Agreement. The Parties' representatives shall not, however, have the authority to amend, modify or waive any provision of this Agreement unless they are authorized officers of their respective entities and such amendment, modification or waiver is made pursuant to Section 12.15.

ARTICLE 10 – LIABILITY, INDEMNIFICATION, AND RELATIONSHIP OF PARTIES

10.1 Limitation on Consequential, Incidental and Indirect Damages

TO THE FULLEST EXTENT PERMITTED BY LAW, NEITHER CONSUMER NOR SELLER, NOR THEIR RESPECTIVE OFFICERS, DIRECTORS, AGENTS, EMPLOYEES, MEMBERS, PARENTS OR AFFILIATES, SUCCESSOR OR ASSIGNS, OR THEIR RESPECTIVE OFFICERS, DIRECTORS, AGENTS, OR EMPLOYEES, SUCCESSORS OR ASSIGNS, SHALL BE LIABLE TO THE OTHER PARTY OR THEIR RESPECTIVE MEMBERS PARENTS, SUBSIDIARIES, AFFILIATES, OFFICERS, DIRECTORS, AGENTS, EMPLOYEES, SUCCESSORS OR ASSIGNS, FOR CLAIMS, SUITS, ACTIONS OR CAUSES OF ACTION FOR INCIDENTAL, INDIRECT, LOST PROFIT SPECIAL, PUNITIVE,

MULTIPLE OR CONSEQUENTIAL DAMAGES CONNECTED WITH OR RESULTING FROM PERFORMANCE OR NON-PERFORMANCE OF THIS AGREEMENT, OR ANY ACTIONS UNDERTAKEN IN CONNECTION WITH OR RELATED TO THIS AGREEMENT, INCLUDING WITHOUT LIMITATION ANY SUCH DAMAGES WHICH ARE BASED UPON CAUSES OF ACTION FOR BREACH OF CONTRACT, TORT (INCLUDING NEGLIGENCE AND MISREPRESENTATION) (BUT EXCLUDING INDEMNITY UNDER SECTION 10.2), BREACH OF WARRANTY, STRICT LIABILITY, STATUTE, OPERATION OF LAW, OR ANY OTHER THEORY OF RECOVERY. THE PARTIES CONFIRM THAT THE EXPRESS REMEDIES AND MEASURES OF DAMAGES PROVIDED IN THIS AGREEMENT SATISFY THE ESSENTIAL PURPOSES HEREOF. FOR BREACH OF ANY PROVISION FOR WHICH AN EXPRESS REMEDY OR MEASURE OF DAMAGES IS PROVIDED, UNLESS OTHERWISE SPECIFIED, SUCH EXPRESS REMEDY OR MEASURE OF DAMAGES SHALL BE THE SOLE AND EXCLUSIVE REMEDY AND THE OBLIGOR'S LIABILITY SHALL BE LIMITED AS SET FORTH IN SUCH PROVISION AND ALL OTHER REMEDIES OR DAMAGES AT LAW OR IN EQUITY ARE WAIVED. IF NO REMEDY OR MEASURE OF DAMAGES IS EXPRESSLY PROVIDED HEREIN, THE OBLIGOR'S LIABILITY SHALL BE LIMITED TO DIRECT ACTUAL DAMAGES ONLY, SUCH DIRECT ACTUAL DAMAGES SHALL BE THE SOLE AND EXCLUSIVE REMEDY AND ALL OTHER REMEDIES OR DAMAGES AT LAW OR IN EQUITY ARE WAIVED. THE PROVISIONS OF THIS SECTION 10.1 SHALL APPLY REGARDLESS OF FAULT AND SHALL SURVIVE TERMINATION, CANCELLATION, SUSPENSION, COMPLETION OR EXPIRATION OF THIS AGREEMENT.

10.2 Limitation on Remedy for Failure to Delivery

THE SELLER WILL NOT BE RESPONSIBLE OR LIABLE TO CONSUMER FOR INJURIES, AND/OR DAMAGE CAUSED BY OR RESULTING FROM FAILURE TO FURNISH ELECTRIC ENERGY AND SERVICE OF ANY KIND AND AMOUNT CONTRACTED FOR, AND/OR FOR INJURIES AND DAMAGES RESULTING FROM THE PERFORMANCE OR NON-PERFORMANCE OR ANY ACTS BY THE SELLER CONNECTED WITH THE FURNISHING OF ENERGY AND SERVICE BY THE SELLER, UNLESS AND THEN ONLY TO THE EXTENT THAT IT BE SHOWN THAT THE NEGLIGENCE OF THE SELLER WAS THE PROXIMATE CAUSE OF ANY INJURY OR DAMAGE COMPLAINED OF.