Proceeding No.: I.08-11-007
Exhibit No.:
Witness: Paul Alvarado

DIRECT TESTIMONY OF

PAUL ALVARADO

SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA
May 18, 2009

SDGE

DIRECT TESTIMONY OF
PAUL ALVARADO
SAN DIEGO GAS & ELECTRIC COMPANY

Q: Please state your name and title.

A: Paul Alvarado. I am Technical Advisor in SDG&E's Distribution Engineering Group.

Q: What are your responsibilities as Technical Advisor?

A: I am responsible for the development and maintenance of SDG&E's overhead distribution construction standards, and also the evaluation and approval of certain distribution equipment, such as non-SCADA overhead switches and overhead hardware. I also provide support for SDG&E's Distribution Planning and Scheduling System (DPSS), including the Assembly Unit and Macro Unit catalogs used by SDG&E planners. I also co-developed and manage SDG&E's avian protection program.

Q: What is the purpose of your testimony in this proceeding?

A: I am testifying as to SDG&E's overhead distribution construction standards and their compliance with General Order 95. I am also testifying regarding the construction history of the span between SDG&E poles 196394 and 196387.

Q: Cal Fire has indicated that the Guejito Fire originated in that span – are you qualified to testify as to issues relating to General Order 95 compliance and the design and construction of the conductors in the subject span?

A: Yes. I have worked at SDG&E for more than 36 years and have been involved with SDG&E's overhead distribution construction standards for 24 years. During that time, I helped develop SDG&E's overhead distribution construction standards based on and in compliance with General Order 95 rules in effect.

Q: Do you believe the span between poles 196394 and 196387 was designed and constructed in compliance with General Order 95 standards?

A: Yes. Based on my longstanding involvement with SDG&E's overhead distribution construction standards, I believe that the span was designed and built in compliance with General

Order 95. It is SDG&E's custom and practice to design so as to meet or even exceed General Order 95 requirements.

Q: Can you give us some background regarding the subject span?

A: Yes. The Guejito Circuit, which includes poles 196394 and 196387, was originally installed in July 1927. At that time, pole numbers 196394 and 196387 had pole numbers 14286 and 14288, respectively. To avoid confusion, I will use the current pole numbers.

Q: Was the span between poles 196394 and 196387 modified or reconstructed at any time after original installation and before October 22, 2007?

A: Yes. Based on my review of the construction records, it appears that in 1956, an anchor was installed at pole 196394, and another phase conductor was added to that pole in 1957. In 1966, pole 196394 was replaced. In 1974, due to work being done to State Highway 78, portions of the Guejito Circuit were relocated, and pole 196394 was moved and replaced at that time. Subsequently, in the late 1970s or early 1980s, pole 14287 -- which was originally between poles 196394 and 196387 -- was removed from service due to its location in a natural drainage area, and the span between poles 196394 and 196387 was reconfigured. Also, our records show that the original span conductors installed in 1927 were #4 solid copper. The conductors were replaced with #4/3 "bare strand" copper, either in connection with the work done in 1974 or the reconfiguration of the span in the late 1970s or early 1980s. In 1988, pole 196387 was replaced. In October 2005, avian protection was installed on the upper level primary conductors attached to pole 196394 (these are not the span conductors between poles 196394 and 196387). It is my belief that this work was and is in compliance with General Order 95.

Q: The report regarding the Guejito Fire that SDG&E submitted to the CPUC in connection with its January 8, 2009 response to data requests indicated that the conductors in this span were also replaced in 1988. Is that correct?

A: Based on my review of the relevant construction work orders, it does not appear to me that the conductors were replaced in 1988. I believe the last time the conductors were replaced prior to October 22, 2007 was in connection with the work done in 1974 or the work done in the late 1970s or early 1980s.

Q: Based on your review of these work orders, did SDG&E do any construction work on the span between poles 196394 and 196387 after Cox installed its facilities in 2001 and before October 22, 2007?

A: No.

Q: Can you visually describe the span between poles 196394 and 196387 – for example, what are the pole top configurations?

A: I have attached photographs of the pole top configurations to my testimony (Exhibits 1 and 2) and can also describe them. Pole 196387 is built to a three-wire delta configuration on a standard 10-foot distribution cross-arm with pin and insulator construction. This means that the center phase conductor is mounted at the top of the pole, centered between the two outer phase conductors, which are on the cross-arm. In this delta configuration, the two outer phase conductors are attached approximately seven feet below the center phase conductor. This construction affords the maximum horizontal phase spacing to keep the conductors from contacting each other. Pole 196394 is built to a three-wire horizontal dead-end configuration on standard 10-foot distribution double dead-end cross-arms. The center phase conductor is attached to the cross-arm through-bolt and centered on the pole. The two outer phase conductors are attached to the cross-arm in the standard position for a dead-end cross-arm. The three conductors are near equal distance apart horizontally. At pole 196394, the closest horizontal distance between phase conductors is 4.67 feet (or 56 inches). At pole 196387, the closest horizontal distance between phase conductors is 5.09 feet (or 61 inches). The horizontal clearance between conductors at both poles actually exceeds the General Order 95 minimum (which is 52 inches).

Q: How long is the span between poles 196394 and 196387?

A: 872.5 feet, according to the survey done by Nolte & Associates.

Q: What type of conductors was in place on October 22, 2007?

A: American Wire Gauge (AWG) #4/3 “bare strand” copper, composed of three strands.

Q: To your knowledge, how was the span between poles 196394 and 196387 designed?

A: It is SDG&E's custom and practice to design its overhead distribution systems in accordance with General Order 95 and its internal overhead construction standards. SDG&E considers a number of factors in the design process, including conductor size and type, wind speed, sag and tension calculations and span length. Longer cross-arms and varying configurations, such as a delta configuration, are often used to increase the phase to phase clearances to ensure compliance. SDG&E uses standard sag and tension tables to ensure adequate clearance above the ground and above foreign utilities. SDG&E also utilizes a computer program called "Sag-10," which generates sag tables based on inputted factors, including conductor size and type, temperature, design tension, ruling span, and longest span. This information is used to ensure that the lines comply with General Order 95 and to perform additional calculations to determine phase spacing. Although we have not been able to find design and construction documents relating to the reconfiguration of the lines that dates back to the late 1970s or early 1980s when pole 14287 was removed, it is my understanding that when pole 14287 was removed a transit was used as part of the work, which would ensure that the resulting longer span remained in compliance with General Order 95.

Q: Do you have any reason to believe that the subject span was not constructed to comply with General Order 95 when it was reconfigured in the late 1970s or early 1980s?

A: No, and the fact that a transit was being used when the work was done indicates to me that the lines were constructed per SDG&E's design.

Q: Would an 872.5-foot span, such as the subject span, be designed using different methods than those used for other spans?

A: No, but for longer spans, the designers would run a custom sag and tension calculation, using the same factors described above. If the subject span was reconfigured before the company had "Sag-10" or the prior program Alcoa Sag and Tension (which was being used when I joined the Distribution Engineering Group in 1985), hand calculations would have been done to determine sag. It is my understanding that the sag would then have been overlaid on the profile of the topography for the area to ensure sufficient ground clearance and that pole heights and configurations would also have been determined using the sag information.

Q: Does SDG&E have any other spans over 850 feet in length in its electric system?

A: Yes. According to SDG&E's records, there are approximately 250 overhead distribution spans in the system that exceed 850 feet.

Q: Is there a wind speed for which the subject span was designed to withstand?

A: The span was designed to light loading criteria pursuant to General Order 95 and SDG&E's internal standards. Light loading takes into account a wind pressure of 8 lbs per square foot of projected area on cylindrical surfaces, which equates to a wind speed of 56 mph.

QUALIFICATIONS

My name is Paul Alvarado. My business address is 8316 Century Park Court, San Diego, California, 92123. I have been employed by San Diego Gas & Electric Company ("SDG&E") for over 36 years. My current title is Technical Advisor and I work in the Electric Distribution Engineering Department. My responsibilities are to create and maintain the Distribution Overhead Construction Standards to ensure compliance with the CPUC General Order 95 Rules, create and maintain the Assembly Units and Macro Units in the Distribution Planning and Scheduling System, and evaluate and approve some of the distribution equipment, including Overhead Switches, Fused Cutouts, Pole Line Hardware, Street Lighting Equipment, and Avian Protection. From my hire date in October 1972 until September 1981, I worked as a power plant operator at the South Bay Power Plant in Chula Vista, California. As an operator, I qualified for and worked as an Auxiliary Engineer, Assistant Control Operator, Control Operator, Relief Shift Supervisor, and Fuel System Transfer Operator. In addition, I trained and certified power plant operators for a period of one year. From September 1981 until May 1983, I worked as an Engineering Assistant at the Silver Gate Power Plant in San Diego, and from May 1983 until October 1983, I worked as a Work Order Planner in the Gas Turbine Maintenance Department at the Station B Power Plant in San Diego. While employed at SDG&E, I earned my Associate in Science degree in Management from Southwestern Community College in June 1985. Prior to my employment at SDG&E, I served in the United States Navy as a Boiler Technician from October 1968 to October 1972. I attended and graduated from Basic Propulsion Engineering School and Boilerman Class A School at Great Lakes Naval Station, North Chicago, IL. While in the Navy, I earned the rank of 2nd Class Petty Officer (E-5).