UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
TEXAS UTILITIES GENERATING COMPANY, et al.	)	Docket Nos. 50-445 50-446
	)	
(Comanche Peak Steam Electric Station, Units 1 and 2)	)	

NRC STAFF TESTIMONY OF LESLIE D. GILBERT AND ROBERT G. TAYLOR ON PLUG WELDING, WEAVE WELDING, DOWNHILL WELDING AND WELD ROD CONTROL (CONSTRUCTION QUALITY)

Q. Mr. Gilbert, please state your name and position with the NRC.

A. My name is Leslie D. Gilbert. I am employed by the United States Nuclear Regulatory Commission ("NRC") as a Reactor Inspector-Mechanical in the Engineering Section, Division of Reactor Project & Engineering Programs, Region IV.

Q. Have you prepared a statement of professional qualifications?

A. Yes, a statement of my professional qualifications is attached to my testimony.

Q. What is the nature of the work you perform for the NRC?

A. I am responsible for inspecting nuclear power plants located in Region IV in the areas of welding and nondestructive examination ("NDE"), primarily for piping systems and containment liners. I have also performed welding and NDE inspections of other systems and components, as directed by my supervisors.

Q. What have been your responsibilities with regard to the Comanche Peak Steam Electric Station, Units 1 and 2 ("CPSES")?

A. I have conducted periodic welding and NDE inspections of the piping system, and containment liner for CPSES during the past 6 years.

Q. Mr. Taylor, please state your name and position with the NRC.

A. My name is Robert G. Taylor. I am employed by the NRC as a Reactor Inspector in the Division of Reactor Project & Engineering Programs, Region IV. I began my assignment in this position on January 22, 1984.

Q. Have you prepared a statement of professional qualifications?

A. Yes, a statement of my professional qualifications was previously admitted into the record.

Q. What is the nature of the work you perform for the NRC?

A. I am responsible for conducting construction inspections of nuclear power plants located in Region IV.

Q. What have been your responsibilities with regard to CPSES?

A. During the period from August 1, 1978, to January 21, 1984, I was the Senior Resident Inspector-Construction ("SRIC") for CPSES. As SRIC, I performed inspections in all areas of construction at CPSES, as I have discussed in more detail in my previous testimony in this proceeding. I have testified on various subjects during hearings in this proceeding.

Q. Messrs. Gilbert and Taylor, have you read the written testimony of Darlene Stiner (CASE Exhibit 667) and the written testimony of Henry Stiner (CASE Exhibit 666); those portions of transcript in this proceeding where Mr. and Mrs. Stiner orally testified concerning their concerns about plug welds, weave welds, downhill welds, and weld rod control; the Applicants' expert witness Mr. Brandt's testimony (Applicants' Exhibit 141) and affidavit (July 15, 1983, attached to "Applicants' Summary of the Record Regarding Weave and Downhill Welding" (July 15, 1983)) and those portions of Atomic Safety Licensing Board's ("Board's") Proposed Initial Decision (July 29, 1983) ("Proposed Decision"), Memorandum and Order (September 23, 1983) ("September 23, 1983 Order"), and Memorandum and Order (October 25, 1983 Order") relating to the welding concerns of Mr. and Mrs. Stiner?

A. (Gilbert and Taylor) Yes, we have read and reviewed those materials. The Board indicated in its three orders that it had some unresolved questions on plug welds, weave welds, downhill welds and weld rod control. Our testimony addresses some of the Board's questions on those subject matters.

PLUG WELDS

Q. Messrs. Gilbert and Taylor, what are "plug welds", as described by Mr. and Mrs. Stiner?

A. (Gilbert and Taylor) Mr. and Mrs. Stiner appear to be concerned about a weld which was performed to fill-in holes which were mistakenly drilled in the wrong location on steel members. Although the Stiners refer to this weld as a "plug weld", in fact the weld that they are describing is not a plug weld as defined in either the American Society for Mechanical Engineers ("ASME") Boiler and Pressure Vessel Code ("ASME Code"), or the American Welding Society ("AWS") Structural Welding Code ("AWS Code").

Q. What are plug welds, as defined by the ASME and AWS Code?

A. The 1983 ASME Code, Section IX, Article QW-492, and the 1975 AWS Code, Appendix I, have identical definitions for plug welds:

> plug weld. A circular weld made through a hole in one member of a lap or T-joint joining that member to the other. The walls of the hole may or may not be parallel and the hole may be partially or completely filled with weld metal. (A fillet welded hole or a spot weld should not be construed as conforming to this definition.)

The 1976 AWS Code made a slight change to the definition of plug welds by deleting the word, "joining" in the above-quoted definition, and substituting the word, "fusing."

As the ASME Code and the AWS Code make clear, a plug weld is a weld which is utilized to join two separate pieces of material together. On the other hand, the "plug welds" which Mr. and Mrs. Stiner describe apparently were utilized to fill misdrilled holes in a single piece of material. Such misdrilled holes may be considered to be material defects. Thus, the "plug welds" described by the Stiners can be considered to be "repair welds."

Q. Does either the ASME Code or the AWS Code prohibit the use of the "plug welds" described by Mr. and Mrs. Stiner for the repair of material defects such as misdrilled holes?

A. The 1975 ASME Code and the AWS Code do not specifically address whether or not "plug welds" may be utilized to repair material defects. However, the 1977 Summer Addenda to the ASME Code clarified the requirements for repair of defects found in materials during the process of fabrication or installation, and allows the use of this type of weld for material repair. ASME Code, Section III, Article NF-4131.

Q. Applicants' witness Mr. Brandt stated (Applicants' Exhibit 141) that "plug welds" were permitted at CPSES to repair misdrilled holes so long as a final visual inspection of such welds is performed by a QC inspector (Brandt testimomy, p. 36). Are there site procedures at CPSES with regard to the utilization of "plug welds" by welders, and the inspection of such "plug welds" by QC inspectors?

A. The Brown and Root procedures for ASME Code structure fabrications do not permit welders to independently repair misdrilled holes by "plug welding" without notifying welding engineering. If welding engineering approves the repair, it is required to generate a "repair process sheet" (RPS) giving the welder the authority, and directions for, repairing the misdrilled hole. The RPS also establishes a hold point which requires a QC inspection of the completed repair.

By contrast, the Brown and Root site procedures for non-ASME Code structure fabrications (i.e., cable tray supports) do not currently require welders to obtain advance authorization of welding engineering to repair misdrilled holes by "plug welds." Prior to January of 1983, Procedure WES-27 did require welders to contact welding engineering to repair misdrilled holes in non-ASME Code structure fabrications, and for a RPS to be generated for those repairs.

Q. Are "plug welds" an acceptable technique for the repair of misdrilled holes?

A. If the "plug weld" repair is correctly made by a welder, there is little concern for the structural adequacy of the repaired material. The steels utilized in both ASME and non-ASME support structures of CPSES are typically ASTM A-36 or A-500 steels. These are both low carbon steels, and are considered to be highly weldable steels which do not suffer any significant metallurgical damage from welding. Accordingly, a welder welding these steels need not take any special care, or possess any special welding proficiency, in order to produce a structurally sound weld.

In addition, the "plug welds" used to repair misdrilled holes probably were made using an E-7018 weld rod, which is the weld rod specified by Brown and Root welding procedures for use in the welding of these steels. The E-7018 rod is a low-hydrogen rod which produces a weld with a tensile strength of approximately 70K pounds, or about 10K pounds better than the tensile strength of the base material. If the "plug weld" was made well enough not to be readily discernable after surface grinding, the weld and the surrounding base material are at least as strong as the original base material before it was drilled.

Q. Has the Staff conducted any inspections to determine whether welders were "plug welding" in accordance with the Brown and Root welding procedures?

A. Yes, the Staff performed an inspection of CPSES to determine if "plug welds" were being utilized by welders in accordance with Brown and Root welding procedures. NRC Inspection Report 81-12/81-12 (April 16, 1982). The Staff interviewed five welders. Three of these welders indicated that they had repaired misdrilled holes. The two remaining welders indicated they did not "plug weld," and stated that it was not authorized at CPSES. Inspection Report 81-12/81-12, p. 6.

Q. Has the Staff conducted any inspections to determine if QC inspectors are, in fact, inspecting "plug welds," in accordance with established procedures and criteria?

A. Yes. As part of Inspection Report 81-12/81-12, Region IV inspectors interviewed three QC inspectors at CPSES regarding "plug welding" of misdrilled holes. These QC inspectors all stated that "plug welding" repairs of misdrilled holes must be inspected by a QC inspector to determine if the weld was done properly, and does not violate Hilti bolt spacing requirements. Inspection Report 81-12/81-12, p. 6.

Q. What are your conclusions on the Stiners' allegations regarding the use of plug welds?

A. "Plug welds" which are utilized to repair misdrilled holes are permitted by Brown and Root procedures for ASME Code structures only if weld engineering approves such repairs. Such approval requires a repair process sheet, and consequently results in a requirement for a QC inspection of the repair. These procedures appear to be followed at CPSES.

WEAVE WELDS

Q. Messrs. Gilbert and Taylor, what are weave welds?

A. (Gilbert and Taylor) Section IX, Article QW-492 of the ASME Code states that weave welding is a weld with "significant transverse oscillation." Section A3.0-76 of the AWS Code also states that a weave bead is "a type of weld bead made with transverse oscillation".

Weave welding may be distinguished from stringer bead welding. Section IX, Article QW-492 of the ASME Code, as well as Appendix A of the AWS Welding Handbook, defines a stringer bead as, "A type of weld bead made without appreciable weaving motion."

Q. Do either the ASME Code or AWS Code prohibit weave welds?

A. No. Neither the ASME Code nor the AWS Code specifically prohibit the use of weave welds. Table QW-415 of the ASME Code, Section IX, specifically identifies variable QW-410.1, which is a "change from the stringer bead technique to the weave bead technique, or vice versa" as a "non-essential variable." A non-essential variable is defined in Article QW-401.4 as:

> A change in a welding condition which will not affect the mechanical properties of a weldment (such as joint design, method of back gouging or cleaning, etc.) (emphasis added)

The ASME Code therefore permits a change from stringer bead welding to weave bead welding without a new qualification of the previously qualified weld procedure.

Q. Applicants' expert witness Mr. Brandt testified that transverse oscillation up to four times the core diameter of the weld rod being utilized is permitted by Brown and Root welding fabrication procedures. What are the Brown and Root procedures on transverse oscillation?

A. Brown and Root procedures for welding of structural supports (which are the type of structures which Mr. and Mrs. Stiner indicated were fabricated using weave welding) generally permit transverse oscillations up to four times the core diameter of the weld rod being utilized.

Q. Is there a technical reason for limiting transverse oscillation during welding?

A. There is no technical reason for limiting transverse oscillation to four weld rod widths for steels not requiring impact testing. However, transverse oscillation during welding of steels requiring impact testing can result in significant detrimental changes in the metallurgical properties of the base material surrounding the weld, making the base material susceptible to the phenomenon known as "brittle fracturing." To detect the existence of this phenomenon, a testing method known as Charpy impact testing, or "notch testing" is required for welding of materials with specified impact properties. Therefore, to avoid the occurrence of brittle fracture, transverse oscillation during welding of impact tested steels may be limited or controlled by specifying a minimum travel speed for welding.

As we discussed earlier, the steels used in ASME and non-ASME structural supports at CPSES are typically ASTM A-36 or A-500 steels, which are low carbon steels and that do not require impact testing. Accordingly, the limitations on transverse oscillation imposed on the fabrication of these supports by Brown and Root are not necessary from a metallurgical viewpoint.

Q. Applicants have stated (Tr. 4598-99, 4650-51) that transverse oscillation during welding which exceeds the 4 weld rod bead width limitation may be repaired by grinding down the weld to conform to that limitation. Is this an acceptable repair procedure?

A. This is an acceptable repair procedure. As we discussed earlier, the Brown and Root limitation for welding of support structures was procedurally imposed, since the steel being utilized in the fabrication of these structures were low carbon steels which are not susceptible to brittle fracture. Accordingly, there is no technical reason why the weld could not be ground down until it is within the four weld rod width limitation. At that point, if the remaining weld metal was smaller than the specified weld, the weld should be built up until the weld was the specified size. If the weld, when ground down, met or exceeded the specified weld size, then no further work is necessary.

Q. Has the Staff conducted any inspections at CPSES to determine whether transverse oscillation in violation of the Brown and Root limitation occurred at CPSES? If so, what were the results of those inspections?

A. Yes. NRC Inspection Report 81-12/81-12 also reports Region IV's inspection of weave welding at CPSES. As set forth in this inspection report, a QC inspector was interviewed, who indicated that a weave weld was correctly rewelded when appropriate supervisors were notified. In addition, five welders interviewed indicated that it was their understanding that weave welds were prohibited, and that they knew of no instances where improper weave welds were not properly repaired. Finally, Region IV inspected pipe supports in the CPSES South Yard Tunnel, in response to an allegation that supports were weave welds.

Q. Gentlemen, can you summarize your conclusions on the Stiners' allegation regarding the use of weave welding?

A. The support structures which the Stiners indicated were fabricated using weave welding, typically utilized steels which do not require impact testing. Therefore, there was no technical reason for Applicants imposing a four weld rod width limitation for transverse oscillation. Grinding down of welds which exceeded this limitation until the limitation is satisfied is an acceptable technique so long as welds ground down below the specified size are subsequently built up to the specified size.

DOWNHILL WELDING

Q. Messrs. Gilbert and Taylor, please describe downhill welding?

A. (Gilbert and Taylor) Downhill welding is a technique where the welder runs his bead from a higher to lower elevation. Neither the ASME Code nor the AWS Code have a specific definition for a downhill weld.

Q. What, if any, are the ASME Code and AWS Code requirements or limitations on downhill welding, and what is the purpose of these requirements?

A. Article QW-405.3, Section IX of the ASME Code requires the welding procedure specifications to be revised (but not requalified), and the welder requalified when:

> A change from upward to downward, or from downward to upward, in the progression specified for any pass of a vertical weld, except that the cover or wash pass may be up or down. The root pass may also be run either up or down when the root pass is removed to sound weld metal in the preparation for welding the second side.

Thus, the ASME Code does not prohibit downhill welding, but if downhill welding is utilized, the welding procedure must specifically state that such welding is permitted, and the welder must be qualified to perform downhill welds.

Section 4.6.8 of the AWS Code requires that prequalified weld procedures specify that:

> The progression for all passes in vertical position welding shall be upward, except that undercut may be required vertically downwards when preheat is in accordance with Table 4.2, but not lower than 70°F (21°C). However, when tubular products are welded, the progression of vertical welding may be upwards or downwards but only in the direction or directions for which the welder is qualified.

If prequalified weld procedures are not used, the AWS Code requires that in vertical welding, a change in the progression specified for any pass from upward to downward or vice versa shall require establishing a new weld procedure by qualification. AWS Code, Section 5.5.2.1(10). The AWS Code also states, with regard to qualification of a welder, that:

> When the plate is in the vertical position, or the pipe or tubing is in the 5G or 6G position, a change in the direction of welding shall require requalification of the welder.

AWS Code, Section 5.16.7. Thus, the AWS Code, like the ASME Code, does not prohibit downhill welding.

Q. Do the Brown and Root weld procedures set forth any limitations on downhill welding?

A. (Taylor) To the best of my knowledge, none of the Brown and Root welding procedures for support structures (such as pipe hangers and cable trays) have been qualified for, or specify, downhill welding. However, Chicago Bridge and Iron ("CB&I") weld procedures do permit downhill welding only for root and cover passes.

Q. Is there a technical justification for the ASME and AWS requirements regarding the utilization of downhill welding?

A. Yes. Welders using downhill welding tend to increase their rate of travel as compared to uphill welding, resulting in a lower heat input. Lower heat input results in a greater possibility for slag inclusion, and poor weld penetration. It is possible to keep the heat input during downhill welding the same as during uphill welding. However, this would result in a larger, and were difficult to control molten puddle. For those reaons, the ASME Code requires each welder to be individually qualified to perform downhill welds.

Q. Mr. Stiner stated (CASE Exhibit 666, pp. 44-46) that downhill welding was utilized in violation of site procedures, and that he performed downhill welding several times. Has the NRC conducted any inspections at CPSES to determine whether downhill welding was utilized in violation of Brown and Root welding procedures?

A. The Staff has not conducted any specific inspections of supports at CPSES to determine if downhill welds were employed. This decision was based, in large part, on the difficulty of detecting downhill welding. Downhill welding on the cover pass can only be detected by noting the direction of ripples in the weld bead. These ripples, which are sometimes hard to discern, point away from the direction of the weld progression. In downhill welding, the ripples would point uphill. However, if the component being welded is repositioned after welding, the ripple direction is not useful as an indication of downhill welding, since one cannot determine the original orientation of the component at the time of welding. Moreover, if the weld beads were surface ground, then the ripples would be destroyed.

For downhill welding of a root pass, there is no way to detect the downhill root pass which is covered over by an uphill cover pass, unless the reverse side of the root pass can be examined. Again, if the orientation of the component was subsequently changed, or if the reverse surface of the root pass were ground, there is no way of determining whether or not the root pass was a downhill weld. Finally, if the root pass was downhill welded on tube steel members, the reverse side of the weld normally cannot be inspected, since the inner surface (interior) of the tube steel member is essentially inaccessible. Thus, it would not be practical to determine whether or not a weld was actually fabricated in the downhill direction.

However, the important question to be answered is not the direction of the weld, but whether the downhill weld is structurally adequate. We reiterate that neither the ASME Code nor the AWS Code prohibit downhill welding. Rather, they allow downhill welds under certain conditions. This indicates that a properly-made downhill weld will be structurally sound.

Single pass fillet welds are non-destructively tested at CPSES for structural adequacy, in accordance with the ASME Code. Multi-pass fillet welds can also be non-destructively tested for structural adequacy, but the surface-testing techniques (e.g., visual inspections, and liquid penetrant testing) utilized at CPSES cannot detect defects in subsurface passes. Neither the ASME Code nor the AWS Code requires (except in certain limited situations) the use of testing techniques (such as magnetic particle testing) which are suitable for evaluating the adequacy of subsurface weld passes.

WELD ROD CONTROL

Q. Messrs. Gilbert and Taylor, what weld rods are being utilized for the fabrication of support structures at CPSES?

A. The E-7018 weld rod is typically used in the fabrication of support structures which the Stiners expressed concerns about. This weld rod is a low-hydrogen rod which was originally developed to prevent underbead cracking. Underbead cracking usually occurs with high strength alloy steels, and is not a significant concern for the ASTM A-36 and A-500 low carbon steels which were utilized in the fabrication of support structures at CPSES.

Q. What are the ASME Code and AWS Code requirements for the control of this weld rod?

A. Article NF-4411, Section III of the ASME Code, entitled, "Identification, Storage, and Handling of Welding Materials," states:

> Each Manufacturer or Installer is responsible for control of the welding electrodes and other materials which are used in the fabrication and installation of components supports (NF-4120). Suitable identification, storage, and handling of electrodes, flux, and other welding materials shall be maintained. Precautions shall be taken to minimize absorption of moisture by electrodes and flux.

No specific requirements are set forth in the ASME Code for the control of E-7018 weld rods.

Section 4.9.2 of the 1975 AWS Code states:

> All electodes having low hydrogen coverings conforming to AWS A5.1 shall be purchased in hermetically-sealed containers or shall be dried for at least two hours between 450°F (230°C) and 500°F (260°C) before they are used. Electrodes having low hydrogen coverings conforming to AWS A5.5 shall be purchased in hermetically-sealed containers or shall be dried at least one hour at temperatures between 700°F (370°C) and 800°F (430°C) before being used. Electrodes shall be dried prior to use if the hermetically-sealed container shows evidence of damage. Immediately after the opening of the hermetically-sealed container or removal of the electrodes from drying ovens, electrodes shall be stored in ovens held at a temperature of at least 250°F (120°C) . . . . Electrodes that have been wet shall not be used.

These requirements have been redesignated as Section 4.5.2 in the 1981 AWS Code. In addition, the final sentence of the 1975 version of Section 4.9.2 has been incorporated into a new Section 4.5.4 in the 1981 AWS Code. Section 4.5.4, entitled, "Redrying Electrodes," states:

> Electrodes that conform to the provisions of 4.5.2 shall subsequently be redried no more than one time. Electrodes that have been wet shall not be used.

Q. Is there a technical justification for the ASME and AWS requirements for the control and use of weld rods, and in particular, low hydrogen weld rods?

A. Yes. In general, weld rod controls are required to ensure that the proper type of weld rod is being used for the weld job, in accordance with the qualified welding procedures.

The detailed requirements of the AWS Code for low-hydrogen rods are intended to assure that the rods do not absorb excessive amounts of water. As discussed earlier, low-hydrogen rods are used to prevent underbead cracking in high strength alloy steels. Water absorbed into the coating of the E-7018 weld rod will be broken down during welding into hydrogen and oxygen. This hydrogen can become incorporated into the metal, thereby increasing the possibility of underbead cracking. In addition, in both low and high alloy steels, water absorbed into the weld rod coating will also be turned into vapor, which can cause porosity and embrittlement. The 7th Edition of the AWS Welding Handbook summarizes the concern with water absorbtion by weld rods as follows:

> Water vapor can be harmful, particularly as a source of hydrogen which can cause porosity and embrittlement. Porosity can be controlled by excluding the gas, or by insuring that the molten metal has sufficient fluidity to allow the gas to escape. As far more serious effect of hydrogen is the formation of cracks in high carbon and alloy steel welded joints . . . . Water vapor can also be harmful in welds because it produces a loss in arc stability.

Thus, the AWS requirements are designed to minimize the absorbtion of water. Although the ASME Code does not set forth weld rod control requirements to the level of detail of the AWS Code, the ASME Code does state that "appropriate" handling and storage of weld rods must occur. Thus, the ASME Code also requires that measures be taken to minimize absorbtion of water by low-hydrogen weld rods.

Q. What are the Brown and Root requirements on control of E-7018 weld rods?

A. Brown and Root procedures require the use of portable weld ovens by welders to hold weld rods while in the field. Welders receive their weld rods from centralized issue stations equipped with fixed drying ovens, an inventory of portable ovens to be used by welders. A log is used to record the number and type of weld rod issued, the identify of the welder receiving the rods, and the type of welding to be performed. At the end of the welder's shift, he or she is required to turn in all unused rods, as well as used weld rod stubs to the control issue stations. The Brown and Root weld rod control procedures appear to comply with the ASME Code.

Q. Mrs. Stiner states that there was a practice at CPSES for welders to check out more weld rods than needed and not return all unused weld rods. She asserted that this practice which could result in welders using rods in an unauthorized manner. She also stated that she found weld rods which were abandoned but not accounted for. Are the Applicants' administrative controls effective in preventing these practices?

A. (Gilbert and Taylor) It would be difficult, if not impossible, for the NRC inspectors to determine whether or not welders check out more welds rods than needed, and then fail to return unused rods. It is difficult to estimate how many rods are needed by a welder for his shift. Therefore, it is not practical to attempt to limit the number of weld rods given to a welder. As for welders not turning i... ...unused weld rods, there is little that can be done, short of assigning a QC inspector to each welder to ensure that all unused weld rods are returned. The administrative system for weld rod control relies primarily upon the integrity of the individual welder to turn in all used weld rod stubs and unused weld rods. This is true even though the Applicants conduct periodic QC inspections and QA audits of weld and controls. For example, it would be easy for a welder to draw out more welds than needed, and then turn in fewer stubs and unused rods than were drawn out while keeping the unused weld rods. (for example, a plausible excuse for returning fewer stubs and unused rods, could be that the missing used weld rod stubs were lost in an inaccessible location. In any case, the Applicants' weld rod control system appear to comply with ASME Code, and are no different than the weld rod control systems employed at other nuclear power plants.

(Taylor) For these reasons, the Staff has not performed any inspections to determine if the practice alleged by Mrs. Stiner exists at CPSES. However, has inspected all aspects of the Applicants' welding activities, including weld controls. I have not found any problems with other weld control procedures. For example, I have performed many routine inspections at CPSES where I observed the use of portable weld ovens, in accordance with Brown and Root procedures.

With regard to the concern with "abandoned" weld rods, I have not observed what I consider to be "abandoned" rods in my routine inspections at CPSES. Since weld rods do not have to be placed in ovens up to the time of use, but may be removed from the ovens for up to 4 hours, I would expect to see rods outside of ovens, if a welder was working nearby.

PROFESSIONAL QUALIFICATIONS

OF

LESLIE D. GILBERT

Mr. Gilbert is a Reactor Inspector, Engineering Section, Nuclear Regulatory Commission, Arlington, Texas. Mr. Gilbert has held this position in Region IV since July 1977 and in the course of his responsibilities has performed inspections and investigations of nuclear facilities under Region IV jurisdiction.

Mr. Gilbert received a Bachelor of Science degree in Metallurgical Engineering from California Polytechnic State College in 1963. He is a registered Professional Engineer in Quality Engineering in the State of California.

<u>Prior Work History</u>

1977 - Present	<u>Reactor Inspector</u> - Serves as a member of the technical staff of Region IV with responsibility for inspection of assigned power reactors during construction.
1968 - 1977	<u>Supervisory Welding Engineer</u> - Supervised the welding engineering staff with responsibility for providing technical direction for fabrication and repair of nuclear submarines at Mare Island Naval Shipyard.
1963 - 1968	<u>Welding Engineer</u> - Served as a welding engineer for the Welding Engineering Division of the Quality Assurance Office at Mare Island Naval Shipyard. Developed welding procedures and resolved welding problems associated with the fabrication and repair of nuclear submarines.

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TEXAS UTILITIES GENERATING COMPANY, *et al*.	)	Docket No. 50-445 50-446
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(Comanche Peak Steam Electric Station, Units 1 and 2)	)	

CERTIFICATE OF SERVICE

I hereby certify that the "NRC STAFF TESTIMONY OF LESLIE D. GILBERT AND ROBERT G. TAYLOR ON PLUG WELDING, WEAVE WELDING, DOWNHILL WELDING AND WELD ROD CONTROL (CONSTRUCTION QUALITY)" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, or deposit in the Nuclear Regulatory Commission's internal mail system (*), or by express mail or overnight delivery(**), this 8th day of February, 1984:

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