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 and 50-446
	)	
(Comanche Peak Steam Electric Station, Units 1 and 2)	)	(Application for Operating Licenses)

REBUTTAL TESTIMONY OF W.E. BAKER, C.T. BRANDT, M.D. MUSCENTE, F.E. COLEMAN, C.R. BROWN, J.D. GREEN, J.E. HALLFORD, I. PICKETT, A.M. BRAUMULLER, AND S. FERNANDEZ REGARDING ALLEGATIONS OF D STINER AND H. STINER CONCERNING WEAVE WELDING, WELDING OF MISDRILLED HOLES, DOWNHILL WELDING, AND WELD ROD CONTROL

Q1. Panel, please state your full name, residence, job title, and educational and professional qualifications.

A1. (Baker) My name is William E. Baker. I reside in Granbury, Texas. I am the Senior Project Welding Engineer employed by Brown & Root, Inc. at Comanche Peak. My educational and professional qualifications are attached (Attachment A).

(Brandt) My name is C. Thomas Brandt. I reside in Fort Worth, Texas. I am the QA Staff Engineer at Comanche Peak. My educational and professional qualifications are attached to Applicants' Exhibit 141 which was previously received into evidence.

(Muscente) My name is Matthew D. Muscente. I reside in Houston, Texas. I am the Manager of Materials Engineering for Brown & Root, Inc. My educational and professional qualifications are attached hereto (Attachment B).

(Coleman) My name is Fred E. Coleman. I reside immediately adjacent to the plant site. I am currently a QC welding inspector at CPSES. I have been employed in positions associated with welding for about 18 years, seven in the nuclear power industry. During the period August 1976-August 1983, I was either a structural welder or welding foreman (assisting about 5-15 welders) at CPSES. During this time, I worked as a welder in the same general area (but not on the same crew) as Darlene Stiner, and as Henry Stiner's welding foreman during much of his first term of employment. My educational and professional qualifications are attached (Attachment C).

(Brown) My name is Clifton R. Brown. I reside in Paluxy, Texas. I am currently a QC welding inspector at CPSES. I have been employed in positions associated with welding for about six years. During the period February 1980-November 1982, I was a structural welder or welding foreman (assisting about nine welders) at CPSES. During this time I worked as a welder in the same areas (but not on the same

crew) as H. Stiner (during his first term of employment) and as his welding foreman (during his second term of employment). My educational and professional qualifications are attached (Attachment D).

(Green) My name is Jimmie D. Green. I reside south of Granbury, Texas (about six miles from the plant site). I have been employed by Brown & Root, Inc. at Comanche Peak for about five and one half years. During Mr. Stiner's second term of employment, I was his foreman.

(Hallford) My name is John E. Hallford. I reside in Granbury, Texas. I am currently employed by Brown & Root, Inc. as the General Foreman of Pipe Hangers at CPSES. I have been a General Foreman at CPSES for about five years. I was Henry Stiner's General Foreman during his second term of employment.

(Pickett) My name is Isiah Pickett. I reside in Cleburne, Texas. I have been employed by Brown & Root, Inc. at CPSES for about seven and one half years, the last four years as a structural welder. I was on the same crew as H. Stiner, during his first term of employment.

(Braumuller) My name is Armand M. Braumuller. I reside in Glen Rose, Texas. I have been a structural welder at CPSES for about four years. I graduated from high school in 1957 and attended two years of college. I have been a welder for about twenty-eight years, working for companies that include Marathon Oil and Pyramid Derricks. I worked on the same crew as Henry Stiner for about seven months during his first term of employment and for the entire one month of his second term of employment.

(Fernandez) My name is Salvador Fernandez. I reside in Granbury, Texas. I have been employed by Brown & Root, Inc. at Comanche Peak for approximately seven years (as a welder for about five years). While I do not remember exactly, personnel records reflect that I worked on the same crew as H. Stiner during his last term of employment (about one month).

Q2. Mr. Baker, could you please explain to the Board how the witness panel was selected to address the concerns raised by Darlene and Henry Stiner concerning weave welding, downhill welding, weld rod control and welding of misdrilled holes?

A2. (Baker) Darlene and Henry Stiner alleged that certain welding practices of Brown & Root employees at Comanche Peak were not in accordance with procedures. Further, Henry Stiner alleged that on many occasions his foremen had

directed him to perform welding outside procedures and had even stood watch for QC inspectors while H. Stiner welded outside procedures. To respond to these allegations, we have assembled a panel of witnesses to provide testimony addressing not only technical aspects of the concerns raised, but also to reflect the welding practices of Brown & Root employees at Comanche Peak with particular emphasis on Henry Stiner's crews.

To provide background, personnel records reflect that Mr. Stiner was first hired on December 5, 1979, and shortly thereafter underwent welder training. He became a structural welder on February 17, 1980 (qualified on February 11, 1980 on Procedures 11065 and 10046). Mr. Stiner's last day of work (for his first term of employment) was November 26, 1980. During this approximately 41 week period, he was absent totally for six weeks and worked 30 hours or less during an additional eight weeks. Mr. Stiner was rehired as a structural welder in June 1981 and welded for approximately three weeks (requalified on the same two procedures on June 22, 1981). Mrs. Stiner was in a qualified welding position (though not welding the entire time) from February 27, 1979 to August 3, 1980. In short, both Mr. and Mrs. Stiner were active welders at Comanche Peak for a relatively short period of time.

To provide testimony as to the welding practices, both on Henry Stiner's crews and throughout the plant, as related to weave welding, downhill welding, weld rod control and welding misdrilled holes, assembled on the panel are the following:

(1) The only three welders we are aware of that were on H. Stiner's crews that are still remaining at CPSES (S. Fernandez, I. Pickett and A.M. Braumuller). Mr. Braumuller was referenced in H. Stiner's testimony. Accordingly, these three welders can testify as to welding practices on Stiner's crews.

(2) Two welding foremen assigned to H. Stiner's crews during his two terms of employment, F.E. Coleman and C.R. Brown, respectively. The welding foreman was a non-supervisory technician who would constantly monitor and assist the work of the five to 15 welders on his crew. Mr. Coleman also worked as a welder in the same areas as D. Stiner and Mr. Brown welded in the same areas as H. Stiner during Stiner's first term of employment. Mr. Coleman was referenced in Mr. Stiner's testimony.

(3) One foreman and one general foreman over Mr. Stiner's crew (J.D. Green and H. Hallford). Both individuals were referenced in Mr. Stiner's testimony.

(4) Mr. C.T. Brandt, QA Staff Engineer at the site who has interviewed many quality control inspectors, reviewed pertinent records and observed welders, can testify as to welding practices.

(5) Mr. W.E. Baker, Senior Project Welding Engineer who has observed welders and interviewed many welders, fitters, supervisors, and welding technicians and can testify as to welding practices.

(6) Mr. Muscente (a metallurgist) who will (along with others previously mentioned) address technical aspects of the welding concerns raised.

In short, this panel will be able to address the technical aspects of the concerns raised as well as testify to the practices in the plant regarding the specific welding practices at issue.

I. Weave Welding

Q3. Panel, are you familiar with Darlene and Henry Stiner's allegations regarding weave welding?

A3. (Panel) Yes. Darlene and Henry Stiner allege that weave welding was common practice at CPSES and that this type of welding is in violation of procedures (Tr. 4147 and 4210-11). Further, Mr. Stiner alleges that his foremen had directed him to weave weld in violation of procedures (Tr. 4211)

Q4. Mr. Brandt, could you please describe what is meant by the term weave welding?

A4. (Brandt) Weave welding is simply welding using an oscillating motion as opposed to a straight motion. Weave welding is not in itself contrary to applicable codes or welding procedures used at Comanche Peak unless the final welding bead width is in excess of four core diameters of the width of the material being used to weld. For example, if the welding material specified to be used is 1/8 inch

diameter electrode, it would be acceptable to use an oscillating weld technique which deposits a bead up to 1/2 inch wide (four times the diameter of the weld rod). In short, weave welding is only unauthorized when the oscillation width is excessive, i.e., in excess of four times the diameter of the weld rod.

Q5. Mr. Baker, how is information regarding the acceptable width of any weld bead transmitted to the welder?

A5. (Baker) Each welding procedure used by the welder has in it a maximum bead width specified in inches for each layer (pass) and size electrode.

Q6. Messrs. Baker and Brandt, in their testimony, both Darlene and Henry Stiner state that while they were in training the instructor asked them to run a 5/16 inch oscillating bead on an I-beam (Tr. 4148 and 4211). They both stated that this was an illegal weave weld contrary to procedures. Was this contrary to procedures?

A6. (Baker and Brandt) No. We believe that Darlene and Henry Stiner have a misconception regarding an unauthorized weave weld. The weld rod they (and all other trainees) used to weld this 5/16 inch fillet weld was 3/32 inch E7018 electrode. Accordingly, up to a 3/8 inch oscillating weld (4 core diameter of the width of the weld rod) was clearly acceptable. Darlene and Henry Stiner state in their testimony that an oscillating pattern of less than this

(i.e., 5/16 inch) was unacceptable. Thus, in our opinion, Darlene and Henry Stiner have a misconception about what was an "illegal" weave weld.

Q7. Messrs. Fernandez, Pickett, and Braumuller (welders from H. Stiner's crews), have you ever heard a foreman or supervisor tell you or anyone else to weave weld in excess of the bead width specified in the acceptable welding procedure?

A7. (Fernandez, Pickett, and Braumuller) No.

Q8. Messrs. Fernandez, Pickett, and Braumuller, have you or any other welder you have seen ever welded using a weaving pattern in excess of the bead width specified in the welding procedure?

A8. (Fernandez, Pickett, and Braumuller) No. We, like other welders, are very much aware that weave welding in excess of the procedures is not authorized.

Q9. Mr. Brown (welder in the same area as H. Stiner and welding foreman from H. Stiner's crew), did you ever instruct Mr. Stiner or any other welder to weave weld in excess of four core diameters width of the weld rod being used or in excess of that specified in the applicable welding procedure?

A9. (Brown) No. I might add that because of the close contact I had with the welders (i.e., monitoring their activities and observing them welding), if a welder in my crew used excessive oscillation as a practice, I would have known about it.

Q10. Mr. Coleman (welder in same area as D. Stiner and welding foreman on H. Stiner's crew), in his testimony Mr. Stiner indicates that you directed him to weave weld in violation of applicable procedures. Did you ever direct Mr. Stiner or any other welder to do this?

A10. (Coleman) Before I answer that question, let me state for the record I live with my family just outside (1 mile from) the plant site. My sister owns land adjacent to the site. My friends and other relatives live in the immediate vicinity of the site. I would not do anything that would potentially jeopardize the safety of this plant. Now, to answer your question, at no time have I ever directed Henry Stiner or any other welder to weave weld in excess of four core diameters of the weld rod used or in violation of the bead width specified in the appropriate weld procedure. On occasion, I have directed welders (perhaps including Mr. Stiner) to weld joints using an oscillating pattern within the acceptable width provided for in the applicable procedures.

Q11. Messrs. Coleman and Brown, have you ever heard a foreman or other supervisor tell any welder to weave weld in excess of four core diameters of the weld material used or in excess of the maximum bead width set forth in the applicable welding procedure?

A11. (Coleman and Brown) No.

Q12. Messrs. Green and Hallford (foreman and general foreman over H. Stiner's crew), Mr. Stiner alleged that supervisory personnel directed him to weave weld contrary to procedures. Have you ever told or heard of anybody telling Mr. Stiner or any other welder to weld in excess of the four core diameter bead width of the rod material being used or in excess of the bead width specified in the appropriate welding procedure?

A12. (Green and Hallford) No. Further, it is common knowledge that if any foreman or supervisor intentionally directed any craft worker to violate established procedures, the foreman would be fired immediately. In this regard, it should be noted that we, like many supervisors, live and intend to remain in the vicinity of the site. Accordingly, this is where our friends and (in many cases) relatives are and where we will raise our families. We would not direct a welder to do something that could adversely impact safety such as perform welding in violation of procedures.

Q13. Mr. Baker, are you aware of any weave welding performed by Brown and Root at Comanche Peak in excess of four core diameters of the weld material used, or in violation of the bead width specified in the governing procedure, which has not been identified by QC and been evaluated and dispositioned?

A13. (Baker) No. Further, I believe that if any welder was using excessive weave welding on safety-related systems or class 5 supports as a practice (as alleged by Darlene and Henry Stiner), I would have known about it. The basis for my statement is my observations of and discussions with welders coupled with the monitoring programs I administer in welding construction, e.g., welding technicians who all report to me and the welder inspection program. Welding technicians are assigned to each area of the plant where welding is taking place. These individuals continuously monitor the welders they are assigned. They know each welder's capability and, more importantly, what each welder is doing and how he or she is doing it. If any welder used excessive weave welding as a practice, it would have been detected. Further, welding engineering (apart from QA/QC) also conducts unannounced inspections of each active welder every approximate 14 days of welding. (For example, during the short time H. Stiner was actively welding, he was inspected 15 times, and Darlene Stiner was inspected at least 28 times

during the period she welded.) During the inspection, the welders identification is verified and all filler material is checked to make sure that it is identified and is that listed on the Weld Filler Material Log. Also, filler material is checked for moisture, grease, or other contaminants. In addition, the welding being performed is checked to assure that it is acceptable. Other parameters checked include progression of travel (uphill or downhill), bead width, and weld rod control. (A copy of the checklist used for the inspections is attached as Attachment E). The welder initials the document reflecting his concurrence.

In view of the training received by welders (both Darlene and Henry Stiner testified that after training they knew excessive weave welding was not allowed), coupled with the extensive checks and inspections by both construction and QA/QC, I believe that the probability of excessive weave welding on safety-related systems and class 5 supports which has not been identified and corrected is very low.

Q14. Mr. Brandt, do you concur with Mr. Baker's response?

A14. (Brandt) Yes. In this regard, if a welder did excessive weave welding as a practice (as alleged by Darlene and Henry Stiner), QC would have found out about it. The basis for my statement is my observations of welders in the plant, and my discussions with numerous QC inspectors (who are monitoring the welders) regarding this issue. In view of the foregoing

and the QA/QC controls associated with safety-related welding and class 5 supports, coupled with the training and qualification of welders and inspections and checks conducted by construction personnel, discussed above, I believe that the probability of excessive weave welding occurring on safety-related systems or class 5 supports which has not been identified and corrected is virtually zero.

II. Downhill Welding

Q15. Panel, are you familiar with Mr. Stiner's allegations that "once metal has been welded on and cut on with a torch, it builds up a magnetic field which causes arc blow" and to correct arc blow "lots of times, people will run a downhill weld instead of doing it correctly, because then you're going in the direction of the magnetic field" (Tr. 4246-47)?

A15. (Panel) Yes.

Q16. Messrs. Baker and Muscente, does previous welding on metal or cutting metal with a torch result in a magnetic field being developed?

A16. (Baker and Muscente) No. Previous welding on metal or cutting metal with a torch will not cause the material to be magnetized.

Q17. Messrs. Baker and Muscente, please describe the phenomenon referred to as arc blow?

A17. (Baker and Muscente) Arc blow is a phenomenon sometimes encountered in D.C. arc welding where the arc is deflected due to the deformation of the magnetic field which is present in some form in all arc welding. This deformation can be caused by welding into an obstruction area (such as a corner) or welding close to a ground. Small amounts of arc blow are beneficial and help the welder form the bead shape, and control molten slag and penetration. If proper grounding is present, arc blow is a problem only at elevated amperage rates, usually above 250 amps.

(Baker) It should be noted that because of the method of grounding we use, the small diameter electrodes and low amperage ranges used in the field for vertical welding (90-120) amps, arc blow for vertical welding is not a problem at CPSES.

Q18. Messrs. Baker and Muscente, is arc blow a result of the base material being magnetized?

A18. (Baker and Muscente) No.

Q19. Mr. Baker, what is meant by downhill welding?

A19. (Baker) Downhill welding is an industry term referring to welding progression proceeding in the vertical down direction.

Q20. Messrs. Baker and Brandt, do the ASME or the AWS Codes state that welding downhill is unacceptable?

A20. (Baker and Brandt) No. Downhill welding is an industry accepted practice for many applications and if properly performed will result in acceptable welds. In this regard, neither the ASME nor AWS Codes exclude any particular direction of progression. Rather, both Codes would allow the contractor to specify direction of travel. While the Codes do not exclude uphill or downhill welding, the Codes do state that regardless of which direction of progression is selected the welder must be qualified to weld in that direction.

Q21. Messrs. Brandt and Baker, is downhill welding at CPSES authorized by procedure?

A21. (Brandt and Baker) Brown & Root welding procedures do not authorize downhill welding. However, CB&I welding procedures do authorize downhill welding.

Q22. Mr. Baker, are Brown & Root welders at CPSES told not to weld downhill?

A22. (Baker) Yes. It is made clear to the welders that downhill welding is not authorized.

Q23. Mr. Baker, are you aware of any evidence which would lead you to conclude that there is unauthorized downhill welding on safety-related systems or class 5 supports at CPSES?

A23. (Baker) From my personal observations of welders at CPSES in combination with my interviews of numerous welders, welding technicians, fitters, welding foremen, and construction

supervision, I am not aware of any evidence which would indicate that unauthorized downhill welding occurs on safety-related systems or class 5 supports at CPSES. Each individual I interviewed was asked specifically if he or she had ever performed or witnessed other persons performing "downhill" welding. Each person questioned stated that he or she had neither used this technique nor witnessed any other Brown & Root welder using downhill progression. Several, however, did state that they had seen welders employed by CB&I welding downhill.

It should be noted that with the weld rod that we use, welding downhill is just as time-consuming as welding uphill. Thus, there is no incentive for a welder to weld downhill, and in fact there is a strong incentive to weld uphill, because a violation of this procedure can lead to disciplinary action.

I would add that based on the surveillance of welding technicians/welding foreman coupled with the extensive construction welder inspections program (discussed above), I believe that if a Brown and Root welder used downhill welding on safety-related systems or class 5 supports as a practice, it would have been detected and I would have learned of it.

Q24. Mr. Brandt, are you aware of any evidence which would lead you to conclude that unauthorized downhill welding on safety-related systems or class 5 supports occurs at CPSES?

A24. (Brandt) Based on my personal observations of welders, my review of pertinent records and my discussions with numerous welders, foremen, fitters and QC inspectors, I am aware of no evidence that would lead me to conclude that unauthorized downhill welding on safety-related systems or class 5 supports occurred at Comanche Peak. (In this regard, to my knowledge, no NCRs have ever been written on downhill welding.) It should be noted that several individuals have told me that they have seen welders employed by CB&I welding downhill.

Q25. Messrs. Fernandez, Pickett and Braumuller (welders from H. Stiner's crews), on safety-related systems or class 5 supports at CPSES, have you ever welded downhill or seen others welding downhill in violation of procedures?

A25. (Fernandez, Pickett, and Braumuller) No. Welding downhill is unauthorized and not in accordance with procedure. Further, there is no motivation to weld downhill. However, there is a great deal of incentive not to weld downhill. If caught welding downhill, a welder could lose his certification or even be fired.

Q26. Messrs. Brown and Coleman (welders in the same area as H. and D. Stiner, respectively, and welding foremen on H. Stiner's crews), on safety-related systems or class 5 supports at CPSES, have you ever welded downhill or seen any other welders at Comanche Peak welding downhill in violation of procedures?

A26. (Brown and Coleman) No. As the welders above stated, there is no incentive to welding downhill. It should be noted that acceptable welds can be made welding downhill, but the welders must be trained to weld in that direction. If a welder inexperienced with the techniques tries to do it, his mistakes would in all likelihood be obvious. In any event, our close monitoring of the work of welders we assisted would have revealed any welder on our crew who had a practice of performing unauthorized downhill welding.

Q27. Mr. Baker, even if a welder was using unauthorized downhill welding, would this have any structural impact on the components welded?

A27. (Baker) Even if there had been some unauthorized downhill welding, the probability that it would have had an adverse impact on plant safety is virtually zero. If the welder was experienced with downhill welding techniques, the downhill weld would in all likelihood be acceptable from a structural standpoint and there would be no impact. If the welder was not experienced, the downhill weld would have obvious

unacceptable visual indications which would be detected by either the welding technician/foreman (before QC inspection) or by the QC inspector during his inspection.

III. Weld Rod Control

Q28. Panel, are you aware of the allegations of Darlene and Henry Stiner regarding weld rod control (excluding the issue of rod containers being plugged in, which was stated by the Board to have "no effect on safe operation of the plant" (Initial Decision (July 28, 1983) at p. 36))?

A28. (Panel) Yes. Mrs. Stiner raised three occurrences of alleged weld rod control problems:

(1) She wrote an NCR on a welder who she alleged had used two weld rods that had been checked out and not returned the day before (Tr. 4166);

(2) She alleged that on one weld 75 rods were reported to have been used when it should have only taken three to four rods (Tr. 4164); and

(3) She found two bundles of rods laying in the plant which she alleges were turned over to a QC supervisor who did not investigate the incident but simply threw the rods in the trash (Tr. 4164).

In addition, Henry Stiner raised one allegation of inappropriate weld rod control, i.e., one day when his crew was pressed to get "a particular line bought off down there by 5:30 that afternoon" he welded hangers with rods that were checked out to others in the crew

(Tr. 4220-21). From these instances Darlene and Henry Stiner allege that weld rod control violations were common practice at CPSES.

Q29. Messrs. Baker and Brandt, describe the weld rod control program at Comanche Peak.

A29. (Baker and Brandt) The Brown and Root weld rod control program at CPSES is governed by a construction procedure. The program is based on a daily system of accountability where each welder is accountable for all weld material he uses on each shift.

At the start of each shift, the foreman signs and issues to each welder one or more weld filler material log (WFML) sheet(s). (Prior to 1979, the form used was called a filler material requisition form; it contained essentially the same information as the WFML.) Each WFML specifies among other things, (1) the specific item or joint to be welded on, (2) the weld rod material type and quantity requested to perform the work, (3) the welding procedure to be used, and (4) the identification symbol of the welder doing the work. The welder then takes the WFML to the appropriate issue station to draw the weld rod material for each specific work item. The distribution station attendant enters on the WFML the amount of material issued and the heat number of the material. The attendant also checks the

welder's symbol against the welder qualification matrix to assure that the welder is qualified for the welding procedure listed and verifies that the material requested is the correct type for use with the procedure. In a separate accountability log, the station attendant lists the welder's symbol and container numbers he has been issued.

After obtaining the filler material, the welder goes to his work station to weld. It should be noted that before a welder uses a weld rod, he checks it to assure that it is not damaged. Damaged and used weld rod stubs are retained by the welder.

At the conclusion of each shift, each welder must return to the issue station to turn in any unused or damaged filler material and to turn in all rod stubs which he has used. The amount of unused and undamaged filler material is entered on the WFML. Unused rods, rod stubs and damaged electrodes are counted and where this count does not equal the number of rods issued, this information is entered on a welder's log which is periodically tracked by the distribution station attendant and reviewed by welding engineering to assure that there is no trend of excessive rod stubs

unaccounted for. If a welder does not turn in his filler material at the end of the shift, this can be a basis for termination of the welder.

In short, regardless of what area the welder is welding in, at the beginning and end of each shift each welder must go to the issue station to disposition the material he is using. In this way, filler material used is accounted for at the beginning and end of each shift. If a welder fails to turn in his filler material at the end of his shift, an investigation is conducted to determine where it is. It should be noted that this weld rod control program exceeds all ASME or AWS code requirements for control programs.

Finally, the Welding Engineering Department inspects the rod distribution stations for compliance with these procedures every two weeks.

Q30. Messrs. Baker and Brandt, what mechanisms are in place to detect violations of the weld rod control procedures?

A30. (Baker and Brandt) The first is the weld rod control program itself. The program requires that at the beginning and end of each shift a welder must go to the appropriate issue station and using a WFML, draw out or return weld filler material used for that shift. If the material is not returned, it will be apparent to

the issue station attendant who will notify the appropriate personnel to investigate. In that the welder has to check in to the distribution station before and after each shift, nothing is to be gained by violating the procedure. On the contrary, violation of the procedure may result in termination of the welder. Accordingly, the welder is motivated to adhere to the procedure.

In addition to the inherent controls built into the weld rod control program itself, there are other mechanisms which provide assurance that violations of the weld rod control program are detected. For example, the periodic inspections of each active welder held approximately every 14 days, coupled with monitoring by welding technicians/foremen and other supervisors, provide assurance that violations are detected. In addition, QC inspections are conducted (as previously mentioned in this testimony) during which weld rod traceability is checked. If weld rod control procedures had been violated, in all likelihood they would be detected in these inspections. In addition, QA and QC conducts random monitoring and surveillance of welders to assure that, among other things, weld rod control procedures are maintained.

In short, based on the checks inherent in the weld rod control program, coupled with the inspections, and surveillance of construction and QA, there is a great deal of assurance that violations of the program such as alleged by Darlene and Henry Stiner will be identified.

Q31. Messrs. Baker and Brandt, even assuming violations of the weld rod control procedure, such as alleged by Darlene and Henry Stiner (i.e., using one day old weld rod and borrowing a weld rod from another welder on the same crew), what adverse impact would this have on the safety of the plant?

A31. (Baker and Brandt) As previously stated, due to the harsh consequences of intentional violations and the inherent checks in the weld rod control program itself, coupled with the inspections, surveillance and checks by both construction and QA/QC, the probability of a violation of the program such as alleged by Darlene and Henry Stiner which goes undetected is virtually zero. However, even assuming that a violation as described by the Stiners is not detected, in our opinion it would have no adverse impact on the safety of the plant due to the type and characteristics of weld rods purchased for CPSES.

All welding on safety-related low carbon and mild steels at CPSES which is of concern here (the welding to which Darlene and Henry Stiner refer in their testimony) uses the same electrode (weld rod), E7018. Thus, the possibility of a welder in this area borrowing an electrode from another on his crew and getting the wrong electrode for the job is virtually nonexistent. It should be noted that, in any event, welders are trained to know that they can only use the specific electrodes designated for that job.

With regard to the Stiners' second concern, the use of a weld rod which had been exposed to the atmosphere for some length of time, as reported in previous testimony the adverse effects on the weld rod (possible accumulation of moisture) could result in increased porosity which, if unacceptable, would be detected by visual inspection and rejected. Nevertheless, to respond to this question, we conducted tests of E7018 electrodes which had been stored for seven months in an open container in an uncontrolled atmosphere. Using this electrode, test specimens were welded utilizing the full penetration butt weld. Both nondestructive and destructive examinations were conducted on the resulting specimen. The radiographs showed no rejectable defects; bend tests conducted on

the specimen showed no rejectable defects; and tensile tests of the specimen resulted in failure of the base material (not the weld material) at a reading in excess of 70 KSI, the maximum requirements for any affected steels (most steels have a much lower requirement). In short, even if weld material was left out for extended periods of time, there is little likelihood that this could have an adverse impact on the safety of the plant.

In sum, even if there was an undetected violation of weld rod control procedures such as alleged by the Stiners, the likelihood that such a violation would have an adverse impact on plant safety is virtually nonexistent.

Q32. Mr. Baker, are welders in the plant informed of the weld rod control program at Comanche Peak?

A32. (Baker) Yes. After successful completion of qualification testing and prior to being released for production welding, each new welder at CPSES is given an orientation by welding engineering as to the requirements of this procedure. The importance of filler material control at the facility is explained to the welder and the welder is informed that any willful

violation of the procedure will result in immediate termination. This orientation is documented and the welder signs a form indicating his understanding.

Q33. Mr. Baker, have you investigated the four allegations of Darlene and Henry Stiner regarding weld rod control procedures noted above?

A33. (Baker) Yes. With regard to Mrs. Stiner's allegation concerning a welder using weld rods he had checked out the previous day (NCR #M82-0034), our investigation revealed that while the facts were substantially as Mrs. Stiner had stated, she did not discuss the resolution. In this case, the welder had completed the weld the day before and was going to alert QC that an inspection was needed the next day. The next morning he was assigned another task, drew his weld rods for the other tasks, and then went back to the weld he had worked on the proceeding day to get a QC inspection. For some reason he did some more welding on the weld (perhaps he saw something he had missed) using two additional rods (either from his rods checked out for other tasks that day, or as Mrs. Stiner alleges, from two rods he kept from the previous day). In any event, the incident was uncovered in the QC inspection and an NCR was written.

The resolution of the NCR was that the welder was terminated immediately and the weld was ground out and replaced. We believe that this instance illustrates that the QA program works and reflects the seriousness with which violations of the weld rod control procedure are viewed.

With regard to Mrs. Stiner's allegations concerning the 75 rods used on one hanger (SI-0135032.S35R) (Tr. 4164), our investigation revealed that only 50 weld rods (not the approximately 75 that she reports) were issued. Further, the weld rod accountability log does not reflect that any rods were missing (i.e., the total number of unused rods, rod stubs and damaged rods turned in was 50). As to the specifics of the incident, records reflect that at 7:10 a.m. on April 9, 1980, the date in question, Robert Benne (the welder) checked out 50 rods for the hanger. At 1:48 p.m. that same day he returned the rod can, unused and damaged rods and rod subs. (Records indicate that there were no missing rods.) The welder then checked out additional rods for another job using a separate WFML. At the end of the day he turned in the remaining unused rods, stubs or damaged rods. The

welder could not remember the incident. In an event, we conclude that the issue does not raise a safety concern.

With regard to Mrs. Stiner's allegation concerning the two bundles of uncontrolled weld rods which she found, it was determined that the two bundles of weld rod material were not immediately discarded without an investigation, as she had indicated. Rather, the weld rod material was given to Mr. Brandt who subsequently turned it over to construction to assure that an investigation was conducted. Further, instructions were issued to reinforce the need to assure close control of weld rods at Comanche Peak. In sum, this illustrates the fact that QA/QC inspectors are closely monitoring the plant for weld rod control violations, and when identified, such violations are investigated.

With regard to the allegation of Henry Stiner that on one day in order to complete a system as quickly as possible welders on his crew exchanged weld rods, we investigated the allegation and determined that welders from Henry Stiner's first crew remaining at Comanche Peak (Messrs. Pickett and Braumuller) stated that no such incident occurred. Further, the welding foreman (Fred Coleman) on Stiner's crew at that time also stated that no such incident occurred.

In any event, even if the incident did occur, all the welders on Stiner's crew would have been welding on the same material with the same type weld rod. Thus, while such action would have been a violation of procedure, it would not have had an adverse impact on plant safety.

In sum, the specific allegations of Henry and Darlene Stiner concerning weld rod control do not raise any issues which would have resulted in a situation adverse to plant safety.

Q34. Messrs. Fernandez, Pickett and Braumuller (welders on H. Stiner's crews), have you observed any violations of weld rod control procedures at Comanche Peak?

A34. (Fernandez, Pickett, and Braumuller) No. During our work at CPSES, we have ourselves neither violated, nor witnessed anyone else violating weld rod control procedures. Violation of weld rod control procedures are treated in a very serious fashion. If a welder at Comanche Peak intentionally violates weld rod control procedures, he is terminated immediately. As a practical matter, there is no motivation to intentionally violate weld rod control procedures. Welders must draw weld rod material at the start of each shift and turn it in at the end of each shift. There is no reason why a welder would keep additional

weld rods in his control to weld on during the next day. Even if he kept them in his control, the next day he would still have to go to the issue station and draw weld rod. Accordingly, there is no reason to keep weld rod in his control after the shift in order to use it the next day.

Q35. Messrs. Coleman and Brown (welders in the same area as D. and H. Stiner, respectively, and welding foremen from H. Stiner's crews), have you yourself ever violated weld rod control procedures or observed others violating weld rod control procedures at Comanche Peak?

A35. (Brown) No. As stated above, there is no motivation for violating weld rod control procedures. Further, welders at the site are very much aware that if procedures are violated they could be terminated immediately.

(Coleman) While I have not observed any violations of others, on one occasion I left a rod can out overnight. I had been assigned a different task in the middle of that shift (after I had finished the weld) and I forgot the can. It had no rods in it. The rod distribution attendant noted that I had not turned it in and alerted my supervisors. It was not an intentional violation,

but the next day I was really "chewed out" by my foreman. From my personal experience, weld rod control is serious business at CPSES.

Q36. Messrs. Green and Hallford (foreman and general foreman over H. Stiner), have you personally observed any weld rod control violations at the Comanche Peak site?

A36. (Green and Hallford) No. However, we are aware of the one welder mentioned in Mrs. Stiner's testimony who was fired.

Q37. Messrs. Baker and Brandt, are you aware of violations of weld rod control procedures at CPSES?

A37. (Baker and Brandt) Yes, a few violations of such procedures have occurred. The NCRs discussed in this testimony are clear examples. However, based on our observations of welders in the plant, as well as our discussions with numerous welders, fitters, foremen, QC inspectors, welding foremen and welding technicians, the weld rod control procedures at CPSES are, with very few exceptions, strictly adhered to. Further, as noted above, even if a violation as raised by D. and H. Stiner occurs and is undetected, the likelihood of such a violation having an adverse impact on plant safety is virtually nonexistent.

IV. Welding of Misdrilled Holes

Q38. Panel, are you familiar with the allegations of Darlene and Henry Stiner regarding welding of misdrilled holes in cable tray and pipe supports, which they term as "plug welding"?

A38. (Panel) Yes. Both Darlene and Henry Stiner state that they felt that this welding was "illegal" (Tr. 4154 and 4219). Further, they allege that they welded misdrilled holes without QC inspectors present and this was somehow improper (Tr. 4154 and 4220). To illustrate that such welding was "illegal", Mr. Stiner states that his foreman directed him to weld misdrilled holes, but told him not to get caught by QC (Tr. 4220). Further, Mr. Stiner alleges that his foremen would watch for QC inspectors while he welded misdrilled holes to assure that no one would catch him (Tr. 4220). In addition, Darlene Stiner appeared to express a concern that unacceptable slag deposits may remain in the hole (Tr. 4154-5).

Q39. Mr. Baker, is welding misdrilled holes in cable tray or pipe supports "illegal" or prohibited by procedures?

A39. (Baker) No. Procedures at Comanche Peak clearly provide for welding of holes in material such as discussed by Darlene and Henry Stiner in their testimony. To be very clear, welding of misdrilled

holes is not "plug welding" as defined by the AWS Code. "Plug welding" noted in the Code is welding one member to another member using a hole in the first member. The purpose of that "plug welding" is to secure two members together and not simply to fill a misdrilled hole as is the case here.

Q40. Mr. Baker, would you please describe how welding of misdrilled holes would be performed?

A40. (Baker) If a hole is misdrilled in a support, such as referred to in Darlene and Henry Stiner's testimony, the welding technique to fill the hole is very simplistic and not at all difficult. It would entail (in overview fashion) welding one side of the hole and letting this cool. After flipping the plate, the slag in the hole from the initial welding would be removed by either a pencil grinder or a chipping hammer. (Although there are some types of welding electrodes manufactured that produce a slag cover that can be welded over, the low hydrogen electrode utilized at CPSES results in a slag covering that is so heavy that an arc cannot be established without first removing the slag.) Next, the second side of the hole would be welded. It should be noted that in the second weld (welding the second side of the hole), using normal

welding techniques would cause any minor slag deposits remaining to float to the top of the weld material, and thus not be trapped inside the weld.

This precise technique is properly described by Darlene Stiner in her testimony (Tr. 4151). In that testimony she states that she welded one side of the hole, chipped the slag out using a hammer, and then welded the other side of the hole. However, she seems to imply that in welding the second hole, slag from the second weld may be trapped in the hole. With the low hydrogen electrodes that we use, normal welding techniques assure that this slag remains fluid, floats to the top of the weld and is removed. (It should be noted that both Darlene and Henry Stiner were only qualified to weld with this low hydrogen electrode.) This technique is used by virtually every welder in the plant and is simply standard practice.

In short, with the low hydrogen electrode used at the plant, it is very difficult, if not impossible, to weld over unacceptable slag deposits using normal techniques. Further, it should be noted that even if you welded over unacceptable slag deposits, in all likelihood, there would be unacceptable surface indications remaining.

In response to this issue, personnel from welding engineering conducted tests using a low hydrogen electrode in an attempt to make unacceptable welds of 3/4 inch holes in 3/8 inch plates. (These specimens were to be used for tests discussed later in this testimony.) Although these highly skilled welders under my supervision tried, using normal techniques, to successfully weld over significant amounts of slag without leaving rejectable surface indications, they were unable to do so. (One time we thought we had welded over slag, but the radiograph showed that no slag was present; it must have floated to the top.) When they were able to weld over unacceptable deposits of slag, they used abnormal welding techniques which were extremely time consuming.

In sum, due to the type of electrode used at Comanche Peak for this type of welding, it would be extremely difficult and time consuming to perform such a weld and leave unacceptable amounts of slag remaining. Even then, there would be visual indications on the surface of the weld that would be easily detectable by quality control personnel.

Q41. Messrs. Brandt and Baker, are inspections conducted of welds of misdrilled holes in safety-related or class 5 cable tray and pipe supports.

A41. (Baker and Brandt) Yes. First, the welder himself inspects his work and if unacceptable he will correct it at that time. It must be remembered that welders have every incentive to perform good welds and absolutely no incentive to perform poor welds. Due to the number of personnel involved in this area, other construction department personnel, including the welding technician, fitters and the welder's foreman, would in all likelihood observe the weld area and could detect unacceptable surface indications.

Further, misdrilled holes on safety-related systems or class 5 hangers require a quality control inspection. The type and timing of this inspection is entirely dependent upon the type of weld. At a minimum, all welds of misdrilled holes of cable tray or pipe supports on safety-related systems or class 5 hangers would require a final visual QC inspection. During this final visual inspection, unacceptable surface indications would be detected.

Q42. Messrs. Fernandez, Pickett and Braumuller (welders on H. Stiner's crews), on safety-related systems or Class 5 supports as CPSES, have you ever welded misdrilled holes?

A42. (Fernandez, and Braumuller) No.

(Pickett) Yes. I have welded misdrilled holes on cable tray supports.

Q43. Mr. Pickett, could you please explain the technique used in welding of misdrilled holes?

A43. (Pickett) The technique is very easy and consists of welding one side of the hole, letting it cool, cleaning out the slag deposits with either a hammer or a pencil grinder, and welding the other side of the hole. It is very difficult, if not impossible, to complete a visually acceptable weld in a hole with slag deposits left in the hole. If you try, the surface of the weld will just turn out to be a mess.

Q44. Messrs. Fernandez, Pickett and Braumuller, have you personally ever welded a misdrilled hole or seen others weld a misdrilled hole in which unacceptable slag deposits were left in the hole?

A44. (Fernandez, Pickett, and Braumuller) No. The welders at Comanche Peak are excellent craftsmen, in my experience. We are proud of what we do and that pride extends to assuring that our work is good.

Q45. Messrs. Fernandez, Pickett and Braumuller, do you believe that welding misdrilled holes is "illegal" or contrary to procedures?

A45. (Fernandez, Pickett, and Braumuller) No.

Q46. Messrs. Fernandez, Pickett and Braumuller, has any foreman ever stood watch for you or any other welder that you were aware of while that welder performed a weld in violation of procedures?

A46. (Fernandez, Pickett, and Braumuller) No. There is no motivation for a welder to do this. He risks the possibility of getting caught and being fired. Further, it is common knowledge that if any foreman was caught doing this, that foreman would be fired immediately. In addition, welding technicians/welding foremen on our crew would not allow such things to happen. If anything such as this would have occurred, we could have gone directly to our welding foreman to indicate to him what was happening. In short, things like this just did not happen at Comanche Peak.

Q47. Messrs. Brown and Coleman, on safety-related systems or class 5 supports at CPSES have you ever witnessed welders welding misdrilled holes in cable tray supports or pipe supports? If so, what techniques were they using, and what were your observations regarding this welding?

A47. (Brown) No.

(Coleman) Yes. Welding of misdrilled holes has occurred at Comanche Peak. This is authorized by procedure, and requires the welder to use a technique which is not difficult. It simply entails welding one side of the hole, removing the slag deposits, and then welding the other side. The slag resulting from welding the second side remains fluid during welding and is floated to the top. I have visually observed welders on my crew welding misdrilled

holes, and this welding was performed correctly and without any problem. It should be noted that if any welder on my crew had a problem with this type welding, because of my constant observations of the welders on my crew I feel that I would have known about it.

Q48. Messrs. Brown and Coleman, have you ever observed a foreman or other supervisor standing watch for QC inspectors while a weld was being performed?

A48. (Brown and Coleman) No. Neither the welders nor foremen would risk termination which would be the case if they were ever caught doing something like this. Further, there is no motivation to do it. If any welding foreman or welding technician had seen this, it would have been reported. In short, activities like this just do not happen at Comanche Peak.

Q49. Messrs. Green and Hallford (foreman and general foreman over H. Stiner), have you ever stood watch or observed anyone else standing watch for QC inspectors while a welder was performing a weld at Comanche Peak?

A49. (Green and Hallford) No. It is common knowledge that if anything like this occurred the foreman would be fired immediately. Further, as we previously stated, the safety of the plant at Comanche Peak is of paramount importance to us.

Q50. Mr. Baker, assuming that Darlene and Henry Stiner's allegations are true and they did welding of misdrilled holes without a QC inspection, would this have a significant safety impact at CPSES?

A50. (Baker) No. The technique used for welding misdrilled holes is extremely simple and does not require a highly skilled welder to perform acceptable welds. Further, as previously stated, it is very difficult with the type weld rod used at CPSES for a welder to weld a misdrilled hole and leave unacceptable slag deposits (the apparent concern expressed by D. Stiner). As we previously stated, highly skilled welders attempted to do this and only after a number of tries were successful. In short, it is very easy to properly weld misdrilled holes and very difficult to leave slag deposits. Accordingly, the welds of misdrilled holes of the Stiners (both qualified welders) were, in all likelihood, acceptable. Further evidence of this is H. Stiner's statements that the welds were themselves visually acceptable (Tr. 4221). I conclude that even if QC inspections were not performed on some of these holes, in all likelihood the welds themselves would have been acceptable.

To provide further assurance that misdrilled holes which were welded and supposedly not inspected by QC would not adversely impact safety, the testimony of the Stiners

was analyzed to determine if any specific welds were alleged to be faulty so that a structural analysis could be performed to determine the impact. However, there was no testimony as to specific faulty welds or to specific hangers or supports where the welds were faulty. (It is not even entirely clear whether the Stiners testified that they themselves performed faulty welding on misdrilled holes.) However, in an attempt to provide further assurance that these allegations would not adversely impact safety, we conducted an analysis of the effects of slag inclusions in a misdrilled hole on the strength of the material.

Test specimens of SA36 plate material with a minimum tensile strength requirement of 58 KSI were prepared. The specimens were approximately eight inches in length and 3/8 inch thick, and, in the area of concern, approximately 1.5 inches in width. A 3/4 inch diameter hole (which was to be welded) was drilled in the area of concern of each specimen. This hole, therefore, comprised 1/2 of the cross-sectional area of the test specimen. (In view of gage tolerance requirements under which a hole cannot be placed nearer than 1-hole diameter to the edge of the material (here being 3/4 inch), this configuration is extremely conservative.)

The hole in one of the specimens was properly welded and radiographed to assure that it was perfect. After numerous attempts and using abnormal welding techniques, the hole in the second specimen was welded with significant slag deposits remaining (as previously stated, it is very difficult to weld over slag in a hole.) The second specimen was radiographed showing major slag inclusions throughout the weld, including one which was about 1/4 inch at its widest point, 1/2 inch in length and about 1/8 inch thick.

Tensile tests were performed on each specimen. The first specimen (with the good weld) failed at a tensile strength of 71,639 psi. Significantly, the failure occurred in the specimen material and not the weld material (i.e., the weld material was stronger than the base material.) The second specimen (with major slag inclusions) failed at a tensile strength of 69,918 psi, still significantly above the 58,000 psi required of the material.

In sum, even when skilled craftsmen attempted to weld a worst case weld such that major slag inclusions were present in the material, the strength of the resultant weld was not significantly lower than the strength of the base material. In short, even if some degree of slag was present in a weld of a misdrilled hole, in my opinion it would not have had a significant adverse impact on the strength of the material.

V. Further Comments

Q52. Panel, is anyone aware of any deficiency in the plant which is contrary to procedures or could adversely impact safe operations of the plant?

A52. (Panel) No.

Q53. Panel, in preparing this testimony did anyone threaten you or in any way try to persuade you to tell anything but what you know to be the absolute truth?

A53. (Panel) No. We were told to tell the absolute truth and that the safety of the plant was the most important thing. Further, we were told that if we reported anything wrong with the plant during our discussions or preparation of the testimony, it would have absolutely no impact on us.

Brown & Root, Inc. Attachment A

WILLIAM E. BAKER
Senior Project Welding Engineer

SUMMARY OF EXPERIENCE:

Over twenty-eight years of diversified experience in the Welding Industry. Experience encompasses fifteen years of pressure vessel and power plant contruction in a supervisory or management position. Have previously received the radiation safety training and security clearances necessary for working at an operating nuclear facility. Currently serving as Senior Project Welding Engineer at Comanche Peak Steam Electric Station.

PROJECT TYPES:

Nuclear Power Plants (PWR)
Conventional Power Plants (Coal Fired)
Nuclear Power Plants (BWR)
Bridges
Undersea Habitats
Nuclear Powered Submarines

ACTIVITIES:

Supervision
Welding
Review
Evaluation
Procedures Drafting
Welder Training & Qualification
Boiler Maintenance

PERSONAL DATA:

Born December 31, 1933, Clarksburg, West Virginia
Courses in Combination Welding, Welding Metallurgy, Math, and Blueprint Reading, Shinnston Technical School, 1954, Graduated
Course in Ultrasonic Theory and Inspection, Cape Fear Technical Institute, 1974
Courses in Basic Principles of Supervisory Management and Developing Supervisory Skills, American Management Association, 1970.
Member, American Welding Society
Married, 1 Child

EMPLOYMENT HISTORY:

Brown & Root, Inc.	Since October 1973
H.H. & I. Contracting, Inc.	1 Year
Pittsburgh Des Moines Steel Co.	4 Years
C.M. Kemp Manufacturing Co.	4 Years
Various Firms	10 Years

Social Security No. : 235-54-7322 June 6, 1983

WILLIAM E. BAKER
Senior Project Welding Engineer

DETAILED PROFESSIONAL EXPERIENCE:

Brown & Root, Inc. - Since 1973

Senior Project Welding Engineer: (6 Years)

Responsibilities include welding program development to satisfy the requirements of design specifications and the ASME Code, management of the Welding Engineering Department within a specified budget in a manner necessary to provide construction the support required to complete welding activities in accordance with project schedules, provide evaluation and resolution of welding related problems pertaining to conflicts or deviation from procedures, specifications or codes. To achieve the above it is necessary to remain current on advancements in the state of the art in welding technology and changes or proposed changes to the ASME, AWS and B31.1 Codes. The latter has been achieved through attendance at, and participation in, meetings of Sections III and IX of the ASME Code Committees.

Texas Utilities Services, Inc.; Glen Rose, Texas -

Comanche Peak Steam Electric Station - Two 1150 MW pressurized water nuclear reactor units.

Carolina Power & Light Co.; Southport, North Carolina -

Brunswick Nuclear Power Plant - Two 821 MW boiling water reactor units.

Carolina Power & Light Co.; Roxboro, North Carolina -

Roxboro Unit 4 - One 721 MW coal-fired unit.

Assistant Project Welding Engineer: (2 Years)

Carolina Power & Light Co.; Southport, North Carolina -

Brunswick Nuclear Power Plant.

H.H. & I. Contracting, Inc. - 1972 - 73

Boilermaker Superintendent: (1 Year)

Planned and supervised the installation of new boilers and related piping and mechanical systems in industrial locations. Responsibilities also included the training and qualification of welders to the ASME IX Code.

Pittsburgh Des Moines Steel Co. - 1968 - 72

Welding Supervisor: (3 Years)

Was responsible for all phases of work as it pertains to welding including documentation, purchasing, and expediting of materails and equipment. Was involved in hiring, training, and qualification of personnel to the

applicable codes for work on nuclear and conventional power plants, bridges, undersea habitats, and nuclear power submarines, utilizing all types of welding processes and equipment, both manual and automatic. On special assignment prior to first nuclear work, was instrumental to implementing QA/QC program including NDT procedures and documentation for fabrication of GE supplied weldments for Peach Bottom Nuclear Plant.

C.M. Kemp Manufacturing Co. - 1964 - 68

Lead Code Welder: (3 Years)

Was working supervisor and welder on high pressure weldments and piping fabricated to the requirements of ASME Code.

Various Construction Firms - 1954 - 64

Welder, Layout Man, and Pipefitter.

Attachment B

MATTHEW D. MUSCENTE

Manager, Materials Engineering

SUMMARY OF EXPERIENCE:

Twenty-five (25)years experience associated with the design, engineering, fabrication, material selection and examination and erection of engineered equipment and systems including pressure vessels pumps and piping.

PERSONAL DATA:

Born: January 18, 1934
U. S. Citizen
Married

EDUCATION:

Bachelor of Science-Metallurgical Engineering, University of Pittsburgh June, 1958

Kepner-Tergoe Problem Solving and Decision Making (Genco II)

COURSE WORK:

Numerous courses related to design, fabrication, erection and testing of engineered equipment and systems to include courses in code requirements and metallurgical considerations.

PROFESSIONAL ASSOCIATIONS:

Member -- AWS
Member -- ASME

REGISTRATIONS:

Registered Professional Quality Engineer -- California

MATTHEW D. MUSCENTE

PROFESSIONAL EXPERIENCE:

Brown & Root, Inc. -- July, 1980 to Present

Manager, Materials Engineering: (3-1/2 years)

Responsible for planning, coordinating, directing and reviewing activities of staff engineers and specialists. The staff consisted of materials engineers, welding engineers, coatings engineers, and insulation and fireproofing specialists. The primary function of the group was to provide technical support to engineering, procurement, inspection and construction organizations working on various Brown & Root fossil and nuclear power plant projects. Also acted as the Welding Program Manager on the South Texas Nuclear Project and reported directly to the Project General Manager. In this position, was the primary point of contact between Brown & Root, the client and NRC representatives on all matters pertaining to welding and materials engineering on the project.

Wyatt Industries,Inc. -- 1978 to 1980

Manager, Fabrication Engineering: (2 years)

Responsible for planning and directing all technical activities associated with the shop fabrication and field installation and erection of pressure vessels, heat transfer equipment, and other equipment. Specific duties include development and qualification of welding procedures and techniques, selection and testing of materials, development and preparation of engineering specifications and fabrication and heat treating procedures, and providing technical support to Wyatt's engineering and construction organizations in the areas of welding, heat treating, inspection and shop fabrication techniques.

General Electric Co. -- 1968 to 1978

Manager, Materials Engineering & Quality Assurance (7 years)

Responsible for managing, directing and reviewing the activities of a Staff of 20 to 25 engineers involved in the design, fabrication, erection, installation, examination and testing of pressure vessels, pumps, valves, piping and auxiliary equipment procurred in Europe for GE-BWR nuclear power plants.

Westinghouse Electric Co. -- 1963 to 1966

Engineering Specialist, Engineering and Development (3 years)

Member of a task force of engineers with specialized skills established to work with manufacturers to solve materials and engineering problems associated with the design and manufacture of highly engineered pressure vessels and auxiliary power plant equipment.

Pearl Harbor Naval Shipyard -- 1961 to 1963

Supervisory Metallurgist: (2 years)

In charge of metallurgical and welding services work area, and was responsible for planning and programming various metallurgical investigations and for conducting testing and evaluation programs that involved both destructive and nondestructive tests.

Attachment C

FRED EARL COLEMAN

SUMMARY OF EXPERIENCE:

Approximately eighteen years welding in various fields. Seven years of this experience welding in the nuclear power industry.

PROJECT TYPES:

Nuclear
Steel Corp.
Marine Dev.

PERSONAL DATA:

Born: September 9, 1941
Hood County
Married

ACTIVITIES (PROJECT)

Welding
Inspection

EDUCATION:

GED/June 21, 1983

EMPLOYMENT HISTORY

Brown & Root, Inc.	August 1976 to Present
American Bridge Division, US Steel	1 year 6½ months
Global Marine Inc.	1 year 1 month
Reynolds Electric	7 years

Social Security Number: 452-64-6496

DETAILED PROFESSIONAL EXPERIENCE:

Brown & Root, Inc., CPSES

QC Inspector C - Sept. 4, 1983 to Present

QC Inspector C, Level II, certified in MIFI, and VT.

FRED EARL COLEMAN

QC Inspector - August to September 1983

Trainee in all related fields.

Pipe Hanger Welder - August 1976 to August 1983

Welding and fitting of Q hangers.

American Bridge Division US Steel Corp.

Welder - Oct. 1974 to April 1976

Welding X-ray welds on tanks.

Fruehauf Corp.

Welder - May 1974 to Oct. 1974

Welding aluminum truck tanks.

Global Marine Development, Inc.

Crane Operator Welder - March 1973 to April 1974

Welding and repairing of mining vessel equipment. Crane operator consisted of pedstal cranes, bridge cranes and gantree cranes.

SIGNATURE Fred E Coleman DATE 11-2-83

Attachment D

CLIFTON R. BROWN

SUMMARY OF EXPERIENCE:

Currently working as a QC inspector, Level II, VT, MIFI and MEI; Two and one half years welding experience for B&R at CPSES. Six months of this I welded on cable tray hangers and two years as a welding foreman, responsible for nine welders. One of my requirements was presenting hanger packages to QC for inspection. For Bahnson, I welded HVAC Hangers together for a period of two years. I was certified on structural and pipe welding for B&R at this time.

PROJECT TYPES:

Nuclear

ACTIVITIES (PROJECT):

Structural Welder
Pipe Welder
Welding Foreman

SOCIAL SECURITY NO.:
453-02-6616

PERSONAL DATA:

Born: August 13, 1954
Hico, Tx.
Single

EDUCATION:

High School: Glen Rose H.S., 1972
Glen Rose, Tx.
College: Tarleton State University
Sept. through Dec. 1972

EMPLOYMENT HISTORY

Brown & Root, Inc., CPSES	February 2, 1980 to Present
Bahnson Envirotech	Aug. 1978 to Jan. 1980
Ratliff Tire Co.	July 1973 to Aug. 1978

DETAILED PROFESSIONAL EXPERIENCE:

Brown & Root, Inc., CPSES

QC Inspector - Nov. 3, 1982 to Present

Currently working as a QC Inspector, Level II on pipe hangers, both large and small bore, moment restraints, piping and pre-hydro walkdowns and receiving. Also received on the job training for magnetic particle and liquid penetrant isnpections.

CLIFTON R. BROWN

Brown & Root, Inc., OSES

Structural Welder - Feb. 2, 1980 to Nov. 3, 1982

Welding on pipe hangers; as a foreman, I presented hanger packages to Quality Control, assured that the welding performed in my area would pass inspection and that the welders were certified to weld on either hangers, connections, restraints and lugs, either carbon or stainless.

Bahnson Environtech

Structural Welder - Aug. 1978 to Jan. 1980

Welding on HVAC hangers and working with a fitter and a helper to build these hangers per the drawings and specifications. I was certified on stick procedure and the MIG welding procedure.

Ratliff Tire Company

July 1973 to Aug. 1978

I was responsible for the daily maintenance of the gas and diesel engines which included both major and minor repairs. I worked with specialized equipment such as air tools, torque wrenches, micrometers and other tools, for the upkeep of equipment at the tire plant, as well as driving a truck in the metroplex to pick up tires.

SIGNATURE Clifton R. Brown DATE 1/20/84

Project: CPSES

Job No. 35-1195

Welder's Symbol _____

Name _____

Brown & Root, Inc.

Welding Engineering Department

Welder Documentation Surveillance Checklist

Welder Surveillance	1	2	3	4
Iso. or Drawing No.				
Weld Identification No.				
Applicable WPS/Rev.				
WFM Class				
WFM Size				
Ammeter M&TE No.				
Voltmeter M&TE No.				
Pyrometer M&TE No.				
Base Metal Thickness (in.)				
Weld Progression				
Preheat Temperature				
Interpass Temperature				
Shielding Gas Type & Flow (cfh)				
Purge Gas Type & Flow (cfh)				
Welding Process/Indicated Pass				
Current and Polarity				
Amperage				
Voltage				
Bead Width (in.)				
Travel Speed (ipm)				
Rod Oven Operational (Sat/Unsat)				
Welding Parameters (Sat/Unsat)				
Inspector Initial/Date of Insp.				
Welder's Initial				

Comments (Discrepancy and Corrective Action):

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Technician's Signature