

U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION IV

Report No. 50-445/79-15; 50-446/79-15

Docket No. 50-445; 50-446

Category A2

Licensee: Texas Utilities Generating Company
2001 Bryon Tower
Dallas, Texas 75201

Facility Name: Comanche Peak, Units 1 & 2

Investigation at: Comanche Peak Steam Electric Station, Glen Rose, Texas

Investigation conducted: May 29 through June 4, 1979

Inspectors: Walrossen 6/21/79
for R. G. Taylor, Reactor Resident Inspector, Project Sections Date

Walrossen 6/21/79
W. A. Crossman, Chief, Projects Section Date

Approved: Walrossen 6/21/79
W. A. Crossman, Chief, Projects Section Date

Investigation Summary:

Investigation on May 29 through June 4, 1979 (Report No. 50-445/79-15; 50-466/79-15)

Areas Investigated: Special investigation of allegation received regarding improper and potentially very poor welding of inter-plate seams in the Unit 1 Refueling Pool, spent fuel pools, and transfer canal of the common facility Fuel Handling Building. The investigation involved twenty-eight inspector-hours by the Reactor Resident Inspector (RRI) and the Chief, Projects Section.

Results: The allegations were neither specifically confirmed nor refuted. The allegations, if confirmed, would have no safety significance. No items of noncompliance or deviations were identified.

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INTRODUCTION

Comanche Peak Steam Electric Station (CPSES), Units 1 and 2 are under construction in Somervell County, Texas, near the town of Glen Rose, Texas. Texas Utilities Generating Company is the Construction Permit holder with Brown and Root, Inc. as the constructor and Gibbs and Hill, Inc. as the Architect/Engineer.

REASON FOR THE INVESTIGATION

The Region IV Reactor Construction and Engineering Support Branch received a telephone call from a former CPSES employee who reported several allegations indicating a potential breakdown in the CPSES Quality Assurance program and a possible threat to the health and safety of the public. The substance of the allegations also appeared in an edition of the Fort Worth Star-Telegram published on May 30, 1979.

SUMMARY OF FACTS

The Region IV Reactor Construction and Engineering Support Branch received a telephone call on May 25, 1979, from a party who identified himself as a former CPSES employee who had worked as a Boilermaker welder. The call was taken jointly by the Branch Chief and the Section Chiefs of the Projects Section and the Engineering Support Section who in turn provided the information to the assigned Resident Reactor Inspector at CPSES on May 29, 1979. The allegations were reviewed with the alleged in an interview which took place on May 30, 1979, at his home. Each of the following allegations relate to welding of stainless steel liners in the Unit 1 Reactor Containment Building or in the common Fuel Handling Building:

1. Allegation No. 1^{1/}

Welding and weld repairs on the liners were difficult because water from concreting activities had run down the leak chase channels and out past the backing strip into the weld area. Welds finally completed were very poor; some welds had been slugged with weld rod and others were so thin that if buffed a second time with 120 grit, they would not have passed PT (Penetrant Test).

2. Allegation No. 2

There are problems with the gate guide (refers to a gate in the Reactor Containment separating the refueling pool from a small storage pool and the transfer canal).

^{1/}The statements above are the allegations as received. Clarifications obtained from the alleged during the interview of May 30, 1979, are indicated by parenthesis.

- a. The gate guide between the large and small pool was welded in the shop. When the gate guide was installed in the pit, the end bevel was cut off so it could be fit-up. When the guide was installed, it was not rebeveled and where a fillet weld of 3/8" was required, only 3/16" fillet weld was made.
 - b. The gate guide had to be welded to both sides of the liner. When welding the back side, the welder had to crawl down between the rebar to get to the weld. The position was so crowded that the welder could not make a good weld. Also, the welder couldn't see what he was welding very well.
 - c. Six inches of the chase channels were left off the gate guide and added after the gate guide was installed. The rebar was so thick in the areas where welding was performed that "you could hardly get your finger through, much less the welding torch." Consequently, the welds were not made properly.
3. Allegation No. 3
- Welders have no experience. They spend as much as 80 hours trying to make a test weld. They finally learn how to make a weld that will pass the qualifying test and then when they get into the field they don't know what they're doing.
4. Allegation No. 4
- There is "lets" of QC coverup. QC is "buying-off" on welds over the phone. One QC inspector bought off a seam before he ever saw the seam and it was not a good weld because water was coming through while the weld was being made. (The buy-off involved was joint preparation and cleanliness preparatory to welding).
5. Allegation No. 5
- Brown and Root is not following procedures in welding the liner plate. (The procedures referred to are welding procedures and specifically refer to use of a down-hand welding technique being used versus the procedurally required up-hand technique).
6. Allegation No. 6
- Some of the top seams 18" above water level on the fuel pool had backing strips tack welded to the liner plate. There are places where the plate did not cover the backing strip. He would not guarantee the weld. The weld was probably 60% rust, air, concrete, etc.

CONCLUSIONS

Review of the CPSES Final Safety Analysis Report, Project Specifications and Engineering Drawings, as they pertain to the liner fabrication and installation, have led to the following conclusions relative to each allegation stated in the Summary of Facts above. To better understand these conclusions, the following considerations are necessary:

The liner systems are not installed to prevent or mitigate the consequences of any of the postulated design basis accidents, but rather are installed to prevent an excessive burden on the liquid waste collection and disposal system and to allow the wall and floor area to be more easily decontaminated after pool usage. The liners as a functioning element are, therefore, not considered safety related and are not normally included in the NRC inspection program.

The liners, as passive elements and parts of the building structure, are usually classified into seismic Category I since if one or more of the liner plates were to become detached from the wall, serious damage could be done to stored fuel assemblies. The plates are, therefore, secured to the concrete supporting structure with a system of weld studs attached to the back of the plate and embedded into the concrete. The weld stud system is not a factor in these allegations.

1. Allegation No. 1

The RRI, based on the interview with the allegor and with other welders, has become reasonably sure that there were difficulties encountered by the welders with water, moisture and in some instances with concrete on the weld surfaces and that in some instances, the welds may not be completely sound internally. These welds, however, serve no strength purpose and need only to be smooth and leak free, factors which are established by visual inspection, dye penetrant examinations, and by vacuum box tests of the joint after it is complete. The allegation, while probably true, has no safety consequence.

2. Allegations No. 2.a, b, & c

These collective allegations, while probably true in a substantial sense, also have no safety consequence. The weld joints in question only need to be smooth and leak free in the case of a. and b. and leak free in the case of c. The welds do not serve to lend strength to the structure.

3. Allegation No. 3

The project specifications for all welding, including the pool liners, require that welders be qualified under the requirements of the American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section IX or a comparable requirement such as those of the American Welding

Society. Section IX of the ASME requires that a welder must perform a weld process involved and the as-welded coupon must pass specified tests when complete. No time limits are specified or implied as a requirement in Section IX for making the qualification test coupon weld. The RRI has verified previously that the site welder qualification program is in full compliance with Section IX.

4. Allegation No. 4

The RRI examined the circumstances surrounding the specific portion of the allegation and discussed the matter with the QC inspector directly involved. It appears that this man, on occasion, was depending on the inspections performed by a fellow inspector and so recorded on the appropriate weld data card. The joint was covered over with tape after it had been inspected for cleanliness and fit-up and the inspector released it over the phone based on the record card entries. Water in the leak chase channels appears to have been a constant problem. The QC inspector may have made a judgement error in not re-examining the joint, but not withstanding, the joint had been inspected and found satisfactory at that time. The RRI did not investigate the alleged "lots" of QC coverup because of the lack of specifics.

5. Allegation No. 5

As noted in the Summary of Facts, the general allegation of failing to follow procedures was subsequently refined in the interview with the allegor to relate specifically to an occasion where the allegor was directed by his supervision to weld down-hand rather than up-hand as required by the welding procedures. ASME Section IX indicates that such a change is in the category of a non-essential variable and, therefore, is not a prohibited change in the procedure, if recorded. It appears that the change was not recorded. Interviews with other welders on the same activity failed to reveal any similar experiences and supervision has denied directing the allegor to perform out-of-procedure. The RRI, therefore, has no mechanism by which to confirm the allegation. Again, assuming that the allegor did weld down-hand instead of up-hand for whatever reason, the consequences of such an action are essentially meaningless as related to a weld, since such a change has no effect on the finished weld of the type involved.

6. Allegation No. 6

The particular welds in question are even less consequential than the other seam welds in a functional sense. These welds, which are above the water line in the pools, do not need to be leak free, just smooth for the purposes of easy decontamination. The allegation, while perhaps true, has no consequence.

DETAILS

1. Persons Contacted

Alleger

The alleger, hereafter identified as Individual "A," is a former employee of Brown and Root, Inc. (the site general contractor). The person identified himself as a former welder assigned to the millwright/boilermaker unit of the construction force.

Principal Licensee Employee

Site Quality Assurance Supervisor

Brown and Root, Inc.

Project Construction Manager

Millwright/Boilermaker Superintendent

Individual "B," a welder currently working as a pipefitter but who was a Boilermaker

Individual "C," a welder currently working as a pipefitter but who was a Boilermaker

Individual "D," a quality control inspector who was assigned to inspection of pool liners

2. Background of Allegations

Individual "A" contacted the Region IV office at approximately 9:25 a.m. on Friday, May 25, 1979, to express concerns about the welding activities which had taken place on the spent fuel pools, cask loading pool and the transfer canal in the common Fuel Handling Building for both Units as well as that work accomplished in the Unit 1 refueling pool and temporary storage pool installed in the Reactor Containment Building.

The RRI was notified of these allegations on Tuesday, May 29, 1979, (May 28 a holiday) and initiated an immediate investigation. The first point of contact was the licensee's site Quality Assurance supervisor who informed the RRI that he was aware of the allegations, since his company had been apprised of them by a newspaper reporter employed by the Fort Worth Star-Telegram.

The site supervisor also informed the RRI that another welder, Individual "B," had expressed similar concerns to the Project Construction Manager on May 23, 1979, and that concerns had been forwarded to site Quality Assurance for investigation. The RRI was provided an informal memorandum giving the results of the investigation dated May 23, 1979.

Individual "A" also contacted the Project Construction Manager on May 24, 1979, and expressed essentially the same concerns as those expressed by Individual "B" and which in turn he expressed to the Region IV office on May 25, 1979. It appears that Individual "A" and his supervision, up through the Project Construction Manager, had reached a substantial point of disagreement and Individual "A" voluntarily terminated his employment at the site as of May 24, 1979. The voluntary termination is a matter of record in Individual "A's" employment file.

3. Investigation

The RPI initiated the site phase of the investigation by extensively reviewing the CPSES Final Safety Analysis Report in order to ascertain the safety classification of the various pools and pool liners involved in the allegation and to review the functional descriptions. Reference to Section 3.2, "Classification of Structures, Components and Systems," in the FSAR does not indicate the liners as being safety related although the buildings in which they exist are shown to be in seismic Category I. Paragraph 3.8.3.7.1 provided a commitment to test the liner seams via a vacuum box for leak tightness and briefly described a leak chase system behind the liner seams. Paragraph 3.8.4.1.3 provided a brief additional description of the function of the liners. Figures 9.3-9 and 11.2-4 revealed that the extensive leak chase system has lead-out piping which leads to a building sump and hence into the liquid radioactive waste collection and disposal system.

The RRI then obtained Project Specification 2323-SS-18, Revision 3, "Stainless Steel Liners," to ascertain what requirements the design engineer had established for the liners. The RRI noted the following significant items from the specification:

- a. The design engineer invoked the general quality assurance requirements of 10 CFR 50, Appendix B on the fabrication and installation work.
- b. The design engineer provided three full pages of detail requirements relative to the system of studs to be welded to the reverse or concrete backed side of the liners.
- c. The design engineer made reference to the inter-plate seam welds only by requiring that the welding procedures and welders be qualified to ASME, Section IX. Criteria for finished welds require that, "Surfaces of all welds shall be smooth and free of any irregularities such as serrations, ridges, crevices, or pinholes which may make it subsequently difficult to achieve an effective washdown of the liner surface." Under testing the design engineer provided the following, "All seam welds shall also be tested by vacuum box for leak tightness for their entire length." No other quality requirements were imposed on the seam welds.

- d. The RRI then obtained the design engineer's drawings S-0831 through S-0834, SI-0560, MI-0581, all of which provide details of liner fabrication and installation. In addition, the RRI obtained vendor design detail drawings for the gate guide installed in the Containment Building between the refueling pool and the temporary storage pool. These drawings, taken collectively, showed that the design engineer had designed a system wherein the liner plates and the gate guide would be supported by and anchored to the surrounding concrete walls by a very extensive system of "T" headed studs welded to the concrete sides of the plates and gate guide frame. The seam welds are entirely from plate-to-plate and provide no attachment into the basic building structure.

The RRI concluded on the basis of the above information that the liner system had been designed such that resistance to seismic effect was vested in the "T" headed stud installation and that the seam welds were necessary only to provide a very low leakage path for the pool water and that what leakage might occur would be drained to an appropriately designed method of disposal.

The RRI interviewed Individual "A" on May 30, 1979, in conjunction with the Region IV Reactor Construction and Engineering Branch, Projects Section Chief, in order to gain additional information relative to each of the allegations received over the telephone on May 25, 1979. The additional information and clarifications were as noted in the Summary of Facts included in this report. In addition, Individual "A" acknowledged that he had only very recently become aware that the stud system existed for holding the plates in place and was, in fact, unaware that the leak chase channels were piped to a collection point for controlled collection and disposal of any leakage which might occur.

The RRI interviewed Individual "B" in the presence of the licensee's site QA supervisor, also on May 30, 1979. (This arrangement was allowed since Individual "B" only came to the attention of the RRI through the assistance of the licensee's representative.) The allegations of Individual "A" were reviewed in detail with Individual "B" who essentially confirmed Allegations 1, 3 and 6, but indicated he had not worked in the Allegation 2 area and further indicated that he had no complaints about lack of effective QC nor had he been instructed not to follow welding procedures.

The RRI interviewed Individual "C" on May 31, 1979, with the same results as those obtained in the interview with Individual "B." Individual "C" indicated that he perhaps was one of the persons referred to by Individual "A" in Allegation 3. He also indicated that he had very limited welding experience before coming to work at CPSES and none in "Heliarc" weld process. He was given some forty hours of very informal training and then used fifty-two hours to make his weld test coupon, a duration that he now considers to be excessive. He now thinks that he is a good welder.

The RRI interviewed Individual "D" on May 30, 1979, and again June 1, 1979, to develop any facts relative to the specific allegation of "buying-off" joints over the phone. Individual "D" categorically denied that he, or to his knowledge any other QC inspector assigned to this work area, had ever "bought-off" a designated inspection point without making the required inspection. On June 1, 1979, Individual "D" indicated that there had been very few occasions when he had given consent to the welders to weld up a seam that, by the inspection reports, had been previously inspected for fit-up and cleanliness. He also indicated that he and others had repeatedly stopped work on welding of seams where it came to their attention that water or moisture was interfering with good welding.

The RRI interviewed the Boilermaker Superintendent on June 4, 1979, relative to his knowledge and/or participation in any of the allegations. He categorically denied ever directing welders to make welds where water or moisture was present, but acknowledged that it was a constant problem. He indicated that he finally received engineering permission to drill holes through the liner at the ends of the leak chase channels so that air could be blown through to dry out the channels and that this action helped a great deal. He indicated that he had continually attempted to impress the welders with the importance of making good seam welds.

4. RRI's Assessment of the Liners

The RRI observed some of the welding work on the refueling pool in the Unit No. 1 containment during the latter part of 1978 and the early part of 1979 incidental to making inspection of other activities in the same work area. The welding appeared to be normal and the dye penetrant examinations appeared to be properly accomplished. The finished surfaces examined have been uniformly smooth and appear sound. The RRI also examined some unfinished areas in the Unit 2 spent fuel pool and can appreciate the difficulties that may be encountered in removing some of the concrete laitance from the vertical weld joint areas.