

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before Administrative Judges:

Peter B. Bloch, Chairman
Dr. Kenneth A. McCollom
Dr. Walter H. Jordan



In the Matter of

ASLBP No. 79-430-060

TEXAS UTILITIES GENERATING COMPANY, et al.

Docket No. 50-445-0L
50-446-0L

(Comanche Peak Steam Electric Station,
Units 1 and 2)

SERVED AUG 1 1983
July 29, 1983

PROPOSED INITIAL DECISION
(Concerning aspects of construction quality control,
emergency planning and Board questions)

This is the first initial decision in this operating license proceeding. The issues we decide today relate to particular allegations of failure of Texas Utilities Generating Company, et al.'s (applicant's) quality assurance program¹ during construction of Comanche Peak and to allegations concerning the adequacy of emergency planning. Hearings on these particular allegations were completed on September 17, 1982 and proposed findings of fact were received from the parties on February 25, 1983.²

¹ Although "quality assurance" and "quality control" sometimes are used in a specialized way, we generally will use these words interchangeably in our opinion.

² The State of Texas did not file proposed findings. Citizens Association for Sound Energy (CASE or intervenor) filed proposed

In this decision we have declared CASE to be in default on each allegation on which it has not filed findings of fact. However, we also have examined each important allegation that is in default in order to determine whether to raise any of these defaulted issues by ourselves (sua sponte). See 10 CFR § 2.760a. In a few instances, we require some additional evidence before determining whether or not to declare a sua sponte issue.

Two of the three members of this Board were added to it after the hearings on the matters we address. Consequently, we have adopted the unusual procedure of issuing a proposed decision. The consequence of calling this a proposed decision is that the Board recognizes that its record is complex and that it is wiser, under the circumstances, to invite comments on our tentative conclusions before we become committed to them. We expect the parties to object to any aspect of this decision which they believe to be in error. Objections must clearly and logically explain what the suspected error is and the legal and factual arguments on which the objection is based.³ Failure to comply with any

findings on some of the allegations discussed in this decision. CASE indicated that it wished an extension of time to file proposed findings on additional issues. However, the parties had been granted a six week extension for filing of proposed findings. Reconsideration of December 7, 1982 Order at 1-2 (December 21, 1982). Under the circumstances, good cause has not been shown for granting CASE more time in which to file its proposed findings.

³ We received Applicants' Summary of the Record Regarding Weave and Downhill Welding (July 15, 1983) during the preparation of this

aspect of this required format may result in a default on the objections.

The Board had posed certain questions and taken some limited evidence, to determine whether there is a serious question that the Board should raise by itself. See 10 C.F.R. § 2.760a. The Board concludes that it is not now raising any of the questions sua sponte.

I. Contention 5 and the Applicable Law

Contention 5 states:

The Applicants' failure to adhere to the quality assurance/quality control provisions required by the construction permits for Comanche Peak, Units 1 and 2, and the requirements of Appendix B of 10 C.F.R. Part 50, and the construction practices employed, specifically in regard to concrete work, mortar blocks, steel, fracture toughness testing, expansion joints, placement of the reactor vessel for Unit 2, welding, inspection and testing, materials used, craft labor qualifications and working conditions (as they may affect QA/QC), and training and organization of QA/QC personnel, have raised substantial questions as to the adequacy of the construction of the facility. As a result, the Commission cannot make the findings required by 10 C.F.R. § 50.57(a) necessary for issuance of an operating license for Comanche Peak.

decision. Since other parties have not had an opportunity to comment on this filing, we have not considered it. However, the filing is a model of the kind of specificity we expect in objections to this decision. It includes footnotes to the record. It also uses an affidavit, which parties may file in support of their objections if they consider it helpful.

Order subsequent to the Prehearing Conference of April 30, 1980, slip op. at 11 (June 16, 1980) (unpublished). As the Board has previously indicated,⁴ this is a broad contention calling into question the applicant's entire quality assurance program.

The Atomic Energy Act of 1956, as amended, § 103, 42 U.S.C. § 2133 (1976), authorizes the Nuclear Regulatory Commission to issue licenses for nuclear power plants to applicants "who agree to observe such safety standards to protect health and to minimize danger to life or property as the Commission may by rule establish...." The Commission has, by rule, required that "[s]tructures, systems, and components important to safety shall be designed, fabricated, erected, and tested to quality standards commensurate with the importance of the safety function to be performed." Criterion 1, Appendix A - General Design Criteria for Nuclear Power Plants, 10 C.F.R. Part 50. A quality assurance program is required to ensure that the safety functions will be properly performed. Id. Criteria for the quality assurance program are set forth in Appendix B to 10 C.F.R. Part 50 and must be discussed in the Preliminary Safety Analysis Report (PSAR) for construction permit applications and in the Final Safety Analysis Report (FSAR) for operating license applications. 10 C.F.R. § 50.34.

The chief concern of the quality assurance program is to identify and correct problems that arise during plant construction or operation.

⁴ Tr. 714.

Indeed, a quality assurance program that failed to find problems would undoubtedly be ineffective.

A problem identified by the quality assurance program may cause concern for the public safety if it cannot be satisfactorily resolved. A program may also cause concern if it identifies an extraordinarily large number of deficiencies, casting doubt on the plant's design and construction processes. Additionally, if a quality assurance program identifies extraordinarily few deficiencies or if we were to find that substantial numbers of deficiencies have been overlooked, that may raise questions about the adequacy of the quality assurance program. At this stage, we are not evaluating the overall efficacy of the quality assurance program, but, rather, whether any of the alleged deficiencies are sufficiently serious and uncorrectable that the plant, due to those deficiencies, cannot operate with the requisite degree of safety.

In other words, we have considered each allegation independently, without regard to whether it may represent a pattern related to the adequacy of the quality assurance program. In addition, there are particular allegations which have been or will be the subject of hearings held after September 17, 1982. These questions are not resolved by this decision.

A. Rock Overbreak

One of the specific allegations encompassed within Contention 5 was that during construction blasting, rock which was supposed to remain

intact was displaced and cracked. The foundation for Comanche Peak is set on a rock structure known as the Glen Rose limestone. This is a marine formation of the Cretaceous age.⁵ The Glen Rose limestone is "soft" or "weak" rock⁶ and is not homogeneous.⁷ Both of these factors make it difficult to predict and control the effects of blasting in this particular rock.

The applicant's geotechnical consultants, Mason-Johnston and Associates, Inc., recommended that all safety-related structures be placed against intact rock.⁸ It was planned that once the site had been leveled off at plant grade (i.e., the mountain top had been removed down to a specified level⁹) excavation for the reactor buildings would assure that their bases would be 40 feet below plant grade.¹⁰ Explosives were used for the purpose of creating a crack in the rock around the perimeter of the hole for each containment building. Further blasting was contemplated to break up the rock within that perimeter crack.¹¹

5 Tr. 803.

6 Tr. 835, 946.

7 Tr. 957-8, 1210.

8 Tr. 809.

9 Tr. 806-07.

10 Tr. 808.

11 Tr. 809-814.

Unexpectedly, the blasting to create the hole for the Unit 1 containment caused approximately the top ten feet of the rock wall around the planned hole to be displaced and to suffer both horizontal and vertical cracking.¹² Although changes were made to the blasting procedures when the hole for the Unit 2 containment was blasted, a similar overbreak pattern emerged.¹³ Overbreak also occurred in excavating for other safety-related buildings.¹⁴ Indeed, the overbreak was so extensive that there was no point in associating particular fractured rock with the excavation of a particular building.¹⁵ Applicant reported the overbreak to the NRC pursuant to 10 C.F.R. § 50.55(e).¹⁶

The extent of the overbreak was determined by digging trenches at increasing distances from the excavation wall and examining them for cracks. When a trench was dug for which any cracks on the side closest to the excavation were found not to have been propagated to the far side of the trench, that was determined to be the edge of the overbreak.¹⁷

12 Tr. 815-16.

13 Tr. 829.

14 Tr. 831, 1208-09, 1269-1272.

15 Tr. 1270.

16 Tr. 845-46, 1270. § 50.55(e) requires that serious breakdowns be reported to the NRC.

17 Tr. 819-21.

Overbreak was detected up to approximately thirty feet from the excavation.¹⁸ While some overbreak is common during construction, the amount of overbreak at Comanche Peak was unexpectedly large.¹⁹

To "repair" the overbreak, all rock within the area of the overbreak was removed utilizing techniques which did not require blasting.²⁰ Once this rock had been removed, some cracks were found in the newly created walls.²¹ These cracks did not appear to be associated with displaced rock and were grouted.²² The original shape of the excavation was restored by filling with concrete the area from which fractured rock had been removed.²³

This "dental" concrete was less strong than that used in constructing the reactor buildings; nevertheless, it was stronger than the fractured rock had been.²⁴ There was uncontroverted testimony from the applicant's panel that, once these repairs had been effected, the foundation was actually improved from what it would have been if the

18 Tr. 820.

19 Tr. 835, 1115, 1209-12.

20 Tr. 817, 821-22.

21 Tr. 823-24.

22 Tr. 832-33, 1272.

23 Tr. 817.

24 Tr. 827, 955-56.

overbreak had not occurred.²⁵ The applicant's witnesses also testified, without contradiction, that the seismic capacity of the site was not impaired by the repair.²⁶

The NRC cited the applicants for failing to have and to utilize quality control procedures for excavation for these safety-related structures.²⁷ Applicant subsequently developed such procedures.²⁸ It is apparent, however, that, even without quality assurance procedures for this excavation, the applicant detected and took action to remedy the overbreak. Moreover, the soundness of all areas excavated before the quality control procedures were instituted was verified by an engineering geologist who was present during all phases of the excavation. The engineering geologist verified the soundness of all the materials on which concrete was to be placed. In making this judgment, he relied on professional knowledge and confirming photographs.²⁹ The repair work, in addition, was subject to quality assurance procedures.³⁰

While it was a quality control deficiency to have done the excavation without quality control procedures, we find that this has not led

25 Tr. 835, 838.

26 Tr. 957-58.

27 Tr. 1051, 1273, 1279; CASE Ex. 15.

28 Tr. 1055.

29 Tr. 1047-48.

30 Tr. 843.

to a lasting deficiency. This potential problem has been negated by the detection and satisfactory repair of the excavation defects which should have been detected by the quality control program. The possible implications of management's failure to implement quality assurance procedures for the excavation activities is not being considered in this decision.

B. Cracks in Concrete

Allegations were raised that cracks were present in the basemat for the containment. CASE presented no witnesses who addressed the allegations. However, CASE did introduce as exhibits a non-conformance report (NCR) and a revision to it which refer to cracks "on 812' Base Mat Containment #1".³¹

Using the pour numbers given in that same NCR and revision,³² witnesses for the applicants and the staff determined that the cracks in question were not in the basemat³³ but were in the reactor shield wall. This is part of the internal concrete which is, in fact, separated from the twelve foot thick concrete basemat by a steel liner.³⁴ The concrete

31 CASE Exs. 8 and 9.

32 Tr. 1363.

33 Tr. 1011-13, 1363.

34 Tr. 850-54, 1181.

pours in which the cracking occurred surround the reactor vessel.³⁵ The wall of which these pours are a part is steel reinforced.³⁶ Its main function is the provision of radiation shielding.³⁷

The witnesses uniformly concluded that these were shrinkage cracks, caused by the shrinkage of concrete as it cools.³⁸ These are essentially hairline cracks into which something as small as a pencil lead would not fit.³⁹ Cracks of this type are not unusual or troublesome when found in large concrete pours.⁴⁰

The staff witnesses believed that the cracks were about two inches deep.⁴¹ The applicant's witnesses believed that the cracks went through the entire depth of the pour.⁴² In determining the structural adequacy of the shield wall, the assumption was made that the cracks went entirely through the pour.⁴³ In addition, expert testimony was given by the architect-engineering firm responsible for the design that a

35 Tr. 856, 859-66; App. Exs. 21 and 22.

36 Tr. 355.

37 Tr. 865.

38 Tr. 867, 870-71, 1384.

39 Tr. 867, 1198.

40 Tr. 869.

41 Tr. 1374-75.

42 Tr. 960.

43 Tr. 1398.

construction joint could have been placed at approximately the location of the shrinkage crack, since the concrete pour was so large. The formation of the shrinkage crack is said to serve much the same purpose as a construction joint at this location might have served.⁴⁴

Unrebutted testimony was presented that these cracks in the concrete did not impair the wall's capacity to perform its intended functions.⁴⁵ Radiation shielding would not be affected.⁴⁶ Nor would the wall's ability to transfer vertical loads.⁴⁷ The reinforcing steel (rebar) in the wall is relied on to take tension loads.⁴⁸

A potential problem that was examined is whether the crack would admit water that would rust the rebar. However, there is unlikely to be any problem with water reaching the reinforcing steel through the cracks, causing rust and weakening the steel's load bearing capacity.⁴⁹ After a short time, the exposed surfaces of the cracks were grouted to present a smooth face for painting.⁵⁰ The grout excludes water.

44 Tr. 882-83.

45 Tr. 885, 1295.

46 Tr. 885-86, 1301.

47 Tr. 869, 1300.

48 Tr. 866, 885.

49 Tr. 897-98, 1022, 1028.

50 Tr. 1205, 1313.

These cracks were identified through the quality assurance system, which illustrates that, at least in this regard, the system was functioning at Comanche Peak. They have been analyzed and minor repairs made. Based on the record before us, we conclude that the repair was adequate and there is no safety problem associated with the cracks.

C. Other Specific Allegations Raised in the
Context of Contention 5

CASE presented several witnesses who made allegations about construction deficiencies and deficiencies in the quality control system at Comanche Peak. However, CASE did not include these matters in its proposed findings even though the proposed findings were mandatory. See Order (Proposed Findings of Fact; CASE Exhibits) at 3-4 (December 7, 1982) (unpublished). Because this Board is consequently left to speculate about what CASE currently contends about these issues, its failure to file proposed findings constitutes abandonment of this portion of its case. See Southern California Edison Co. (San Onofre Nuclear Generating Station, Units 2 and 3), ALAB-717, 17 NRC _____, slip op. at 48-49 (March 4, 1983); Detroit Edison Co. (Enrico Fermi Atomic Power Plant, Unit 2), ALAB-709, 17 NRC _____ (January 4, 1983); 10 C.F.R. § 2.754(b).

We therefore find that CASE has abandoned the allegations on which it has not filed findings. We have, however, considered whether these allegations raise such serious questions of public health and safety that we should raise them as sua sponte issues. We discuss briefly why, based on the record, we either have decided not to raise these matters

sua sponte or have indicated that further information is required before we can reach that determination.⁵¹

1. Allegations by John Junior Gates

CASE witness John Junior Gates was a carpenter who worked on the Comanche Peak site from November 1976 to March 1979.⁵² Much of his concern related to the fact that work was done and, due to design changes, had to be ripped out and redone. He related this to increased cost and low worker morale. As Mr. Gates himself testified, rework and low worker morale does not affect the quality of the plant if ultimately the work will only be approved when it is done correctly.⁵³ Mr. Gates testified that he did not know whether in the end the work was done correctly.⁵⁴ The fact that rework was required, however, suggests that approval was not forthcoming unless the work met the specifications. The Board finds that this allegation does not by itself raise a serious health or safety issue.

⁵¹ Some of the allegations could relate to the question of the extent of management's commitment to quality control. That issue, of course, we have specifically left open in this decision. In addition, matters which relate to allegations made by CASE witnesses Mark Walsh and Jack Doyle or to issues raised by the staff's Construction Appraisal Team report also remain open.

⁵² Testimony of John Junior Gates, CASE Ex. 651, at 5.

⁵³ Tr. 2795, 2820-21.

⁵⁴ Gates Testimony, CASE Ex. 651, at 21.

Mr. Gates also alleged that at one point work on the steel liner for the Unit 1 containment was halted because the steel liner was four inches out of plumb.⁵⁵ The applicant agreed that the liner had been out of alignment, but applicant's witnesses testified that this had been corrected to within specified tolerances.⁵⁶ Construction was stopped and stiffeners were added to the inside of the liner, bringing it back in line before continuing construction.⁵⁷ This matter does not raise an issue which the Board finds it should pursue sua sponte.

According to Mr. Gates certain water stops were improperly installed.⁵⁸ He mentioned that nails were put in the water stops, tacking them to the forms. A water stop is a neoprene strip half of which is embedded in concrete on each side of a joint in a wall. Since the nails are located at a distance away from the actual joint, applicant assured the Board that there is no problem of leakage from this normal procedure.⁵⁹ The forms are removed, together with the nails after the concrete is poured. The applicant also testified that, as of the time of the hearing, no water seepage was occurring through the outside walls

55 Gates Testimony, CASE Ex. 651, at 37.

56 Tr. 2988, 2992.

57 Tr. 2992-93, 2995-3000.

58 Gates Testimony, CASE Ex. 651, at 37.

59 Tr. 2989-90.

of any safety-related building.⁶⁰ For these reasons, we see no need to pursue these questions further.

Mr. Gates also alleged that the concrete work at Comanche Peak was "sloppy." He mentioned observing honeycombing, watery concrete, and materials left in the concrete.⁶¹ His knowledge, however, did not seem to extend to whether possible problems have been corrected.⁶² To illustrate the problems with the concrete work, Mr. Gates pointed to a photograph of the containment buildings.⁶³ He stated, however, that the defects which he believed were shown by the photographs would not have any structural significance.⁶⁴ This lack of structural significance was confirmed by Ralph McGrane, a professional engineer who appeared as a witness for the applicant.⁶⁵ The Board finds that Mr. Gates' allegations about concrete work do not contain any specific information which causes the Board to be concerned with the structural integrity of safety-related concrete at Comanche Peak. Hence, the Board will not raise this issue sua sponte.

⁶⁰ Tr. 2993.

⁶¹ Gates Testimony, CASE Ex. 651, at 24-26, 36.

⁶² See, e. g. Tr. 2842; Gates Testimony, CASE Ex. 651, at 26.

⁶³ Gates Testimony, CASE Ex. 651, at 24; Board Ex. 4.

⁶⁴ Tr. 2883.

⁶⁵ Tr. 2990-92.

2. Allegations by Stanley G. Miles

CASE witness Stanley G. Miles was employed at Comanche Peak from March 1977 to May 1982.⁶⁶ Like Mr. Gates, he was concerned about low worker morale.⁶⁷ Low morale alone, assuming that it could be adequately defined and measured, does not raise health and safety concerns. Only if low morale causes defective work to be accepted as the final product would this cause us to question the safety of the plant. We have no reason to believe that defective work was accepted. If a specific instance is brought to our attention, we can, of course, address that specific instance. As a general matter, however, we have no reason to raise a question about the possibility that low morale has, by itself, led to an unsafe plant.

Mr. Miles also alleged that in one instance he was instructed to do work for which he had not been provided a blueprint.⁶⁸ He alleged that he had welded boom struts on rigs manufactured by Manitowoc, in violation of the conditions of Manitowoc's warranty.⁶⁹ He alleged that

⁶⁶ Testimony of Stanley G. Miles, CASE Ex. 655, at 1.

⁶⁷ Id. at 49.

⁶⁸ Miles Testimony. CASE Ex. 655, at 31.

⁶⁹ Supplementary Testimony of Stanley G. Miles, CASE Ex. 657, at 4.

a panel was made to appear to have been anchored with Hilti bolts when it had not been.⁷⁰

None of these allegations would have safety significance for the plant. Neither Mr. Miles' work without a blueprint nor the false Hilti bolts, apparently anchoring the panel, occurred in a safety-related area.⁷¹ The Manitowoc rigs apparently are no longer even used on the Comanche Peak site.⁷²

Mr. Miles also alleged that there were problems with the polar crane. He alleged that there were 3/8 inch gaps between each longitudinal section of the rails on which the polar crane ran. As the crane was operated, the rails could move, accumulating some of the gaps so that as much as five inches could be found in a single gap. When the polar crane wheel dropped into this gap, it would stop.⁷³ However, Mr. Miles also testified that the problem had been corrected by the clips that he personally had installed. These clips were made of a weld-on piece, a bolt-on piece and the bolt itself.⁷⁴ So there is no defect remaining that the Board might declare to be a sua sponte issue.

⁷⁰ Miles Testimony, CASE Ex. 655, at 26-27.

⁷¹ Id. at 31, 27.

⁷² Miles Supplementary Testimony, CASE Ex. 657, at 5-6.

⁷³ Tr. 2932.

⁷⁴ Tr. 2978-79.

Also, in connection with the polar crane, Mr. Miles alleged that, contrary to the design documents, "fingers" were cut off of several shims to make them fit in their designated places.⁷⁵ It appears that this did occur. However, the Board does not believe that it is a matter which the Board should pursue sua sponte because it appears that the staff and the applicant are addressing it. The staff issued a Notice of Violation in connection with the failure to inspect these shims.⁷⁶ The applicant has stated that all the shims in the polar crane girder support bracket assemblies will be removed and inspected. Shims which have clipped "fingers" will be evaluated by an engineer to determine whether they are acceptable.⁷⁷

3. Allegations by Cordella Marie Hamilton
and Robert L. Hamilton

Mr. Robert L. and Mrs. Cordella Marie Hamilton appeared as a panel; both raised concerns about the quality assurance program for protective coatings. Mrs. Hamilton worked as a documentation clerk for the protective coating quality assurance program.⁷⁸ Mr. Hamilton was a quality

⁷⁵ Miles Testimony, CASE Ex. 655, at 17.

⁷⁶ Staff Ex. 148B.

⁷⁷ Testimony of John T. Merritt, Jr. Regarding Placement of Shims in Polar Crane Glider Support Bracket Assemblies, App. Ex. 127, at 6.

⁷⁸ Testimony of Cordella Marie Hamilton, witness for CASE, CASE Ex. 652, at 1-2.

assurance supervisor for the protective coatings.⁷⁹ Certain allegations in this area were made by Mr. Hamilton, certain allegations were made by Mrs. Hamilton, and certain allegations were made by both.

Mrs. Hamilton alleged that there were deficiencies in documentation for protective coating quality assurance. Specifically Mrs. Hamilton alleged that some paperwork required a large number of revisions or was never corrected and that approximately fifteen quality assurance inspection reports were lost.⁸⁰ Mrs. Hamilton testified, however, that the problems were identified through an audit and all necessary corrections were made.⁸¹ Reinspection was required because documentation was missing. Although Mrs. Hamilton did not believe the required reinspection took place, because the material was out in the field and had been cut up,⁸² she indicated that the lost documentation had not indicated any deficiencies.⁸³ Therefore, it appears that the documentation problems identified by Mrs. Hamilton either have been corrected or had no safety significance. In addition, it appears that the procedures

79 Testimony of Robert L. Hamilton, witness for CASE, CASE Ex. 653, at 1.

80 C. Hamilton Testimony, CASE Ex. 652, at 5, 9-10.

81 Id. at 8, 9, 14. It is not clear from Mrs. Hamilton's testimony whether there was an audit by the applicant or an inspection by the NRC. However, an NRC inspection report did note deficiencies in the program in 1981. See App. Ex. 44B.

82 C. Hamilton Testimony, CASE Ex. 652, at 15, 18.

83 Id. at 18.

governing paperwork for protective coating quality assurance were changed in July 1981.⁸⁴ Thus it would seem that the source of the alleged problems also has been addressed. The Board finds nothing to raise as a sua sponte issue arising from this allegation.

Mrs. Hamilton was also concerned about the specified method for determining "tack-free time" for paint, but she admitted that she did not know that the method being used was incorrect.⁸⁵ She further alleged that there were problems with the calibration of instruments used in paint inspections.⁸⁶ These two allegations, made by a lay witness in very general terms, are insufficient to indicate a deficiency or to serve as a basis for a sua sponte question by the Board. They appear to be in the nature of general questions rather than the identification of specific problems which might require a serious inquiry.

Mrs. Hamilton alleged that for a year quality control inspectors were directed not to write NCRs on work done by the paint department.⁸⁷ Mr. Hamilton testified that he was directed to stop writing if not any, at least so many, NCRs.⁸⁸ Neither the staff nor the applicant addressed these allegations directly. These allegations are, however, closely

84 Id. at 13.

85 Id. at 18-19.

86 Id. at 21-22.

87 Id. at 19.

88 R. Hamilton Testimony, CASE Ex. 653, at 22, 43, 53-54.

related to the issue of management's commitment to the quality control program. As such, they remain open.

In addition, Mr. Hamilton's allegation that craft personnel harassed quality control inspectors⁸⁹ is related to management's attitude towards the quality assurance program. If management permitted or failed to discourage harassment of inspectors, that would, of course, reflect adversely on that attitude. The question of whether this has occurred remains open.

Mr. Hamilton alleged that he and two other inspectors were fired for trying to do their inspection job.⁹⁰ The given reason for his firing was that he refused to make an inspection under what he believed were unsafe working conditions. However, he alleged that other individuals who refused to make the same inspection under the same conditions were not fired.⁹¹ This allegation is relevant to the applicant's attitude towards the quality control program and will be dealt with in a subsequent decision.

Mr. Hamilton also alleged that his quality assurance supervision was not qualified.⁹² While this could also reflect on management's commitment to quality assurance, we note that Mr. Hamilton's concerns in

89 Id. at 36-38.

90 Id. at 26.

91 Id.

92 Id. at 14, 16.

this regard apparently related to his opinion that he was more knowledgeable than his supervisors in the area of procedures for quality assurance inspection of paint.⁹³ He disagreed with changes in procedures and objected to supervisors overruling quality control inspectors on specific inspection findings.⁹⁴ We do not believe that an employee's disagreement with a decision made by his supervisor raises sufficient questions about the supervisor's qualifications that the Board should raise supervisor qualifications as a sua sponte issue. However, there appears to be a gap in the record because neither the applicant or the staff has testified about whether the procedures which Mr. Hamilton criticized were, in fact, acceptable. (Specifically Mr. Hamilton has questioned the lack of standards for determining near white blast for surface preparation, the lack of a maximum roughness for steel substrate surface, and procedural changes which allegedly reduced all painting inspection to adhesion testing.) If evidence introduced on this open item led us to conclude that there were significant faults in these inspection procedures, that could lead us to question the qualifications of the supervisors who approved them as well as the adequacy of the inspections performed following them. We note, however, that this does

93 Id. at 16, 39, 43.

94 Id. at 15, 16, 18-19, 38.

not indicate any present conclusion by the Board that problems exist in this regard.

It also appears that Mr. Hamilton disagreed with dispositions of NCRs. He disagreed with the repair method for minor defects in painting.⁹⁵ He questioned the disposition of an NCR which addressed contamination of a painted surface which was force-cured using Kelly heaters which smoked.⁹⁶ Once again, these specific allegations were not addressed in the hearing by either the applicant or the staff. Since the implications of a failure to provide adequate disposition of NCRs could be serious, we consider this an open item. In particular, we need to be able to evaluate the disposition of the NCR related to smoking Kelly heaters and the procedures for repair of minor defects, as specified by Mr. Hamilton.

There is one other allegation made by Mr. Hamilton which the Board is currently unable to evaluate. Mr. Hamilton alleged that a paint applied by Westinghouse and not tested by the applicant's quality

95 Id. at 15.

96 Id. at 21-22. He also questioned the disposition of an NCR on which he had documented what he believed was grease in paint. Id. at 21. However, it was shown that the paint was ultimately returned to the vendor. Tr. 3502; App. Ex. 139. While Mr. Hamilton believed some of the paint had been used, he had applied hold tags to the containers, the amount of paint missing was small (less than 2 containers), and some of the paint would have been used in an attempt to strain it and remove the foreign matter. Tr. 3503-05. The Board is satisfied that this NCR was properly dispositioned and does not raise any question of the safe operation of the plant.

control program could not pass an adhesion test.⁹⁷ We need to determine whether this use of paint is safety-related and, if so, whether the paint will perform satisfactorily.

Mr. Hamilton alleged that an audit of Carboline, a paint vendor, was a "white-wash."⁹⁸ This audit followed two audits which had found unsatisfactory conditions at the Carboline plant. Mr. Hamilton was not present for the audit which he felt was a white-wash and based his charges on a "gut feeling."⁹⁹ He admitted that the sequence of events concerning Carboline would appear to illustrate the satisfactory performance of the quality assurance program in resolving unsatisfactory conditions.¹⁰⁰ There is no evidence that the audits of Carboline demonstrate anything other than appropriate functioning of the quality control program. Mr. Hamilton's gut feeling is not sufficient to induce us to inquire further.

Another of Mr. Hamilton's allegations addressed undocumented removal of cable trays for which quality assurance documentation had been completed.¹⁰¹ Documentation problems have been noted by the NRC Construction Appraisal Team (CAT) and were addressed in a hearing

97 R. Hamilton Testimony, CASE Ex. 653, at 55.

98 Id. at 24-25.

99 Id. at 47-48; Tr. 3522.

100 R. Hamilton Testimony, CASE Ex. 653, at 54.

101 Id. at 55.

subsequent to the parties' filing of proposed findings of fact. This allegation will be considered at the time the CAT findings are addressed.

Other allegations made by Mr. Hamilton do not require that the Board raise sua sponte issues because they have not been sufficiently related to deficiencies in the quality assurance program; consequently, the Board does not believe that, if true, they would raise serious health or safety issues. These include allegations that the only quality control vault ceiling is fire-proof,¹⁰² that it takes some time to retrieve records from the quality assurance vault,¹⁰³ that quality control inspectors did not observe paint being applied to buildings outside the containment,¹⁰⁴ and that he was never instructed to take greater care because the project was a nuclear plant.¹⁰⁵

4. Allegations by Darlene K. Stiner
and Henry A. Stiner

Darlene K. Stiner and Henry A. Stiner appeared as a panel providing direct testimony for CASE. Mr. Stiner had worked at Comanche Peak as a

102 Id.

103 Id.

104 Id. at 59.

105 Id. at 65.

welder from November 1979 to December 1980 and from June to July 1981.¹⁰⁶ Mrs. Stiner began working at Comanche Peak in August 1977 and was employed there at the time she testified.¹⁰⁷ She had been employed as a welder and was a quality assurance inspector at the time she testified.¹⁰⁸

In his direct testimony Mr. Stiner indicated that he had a criminal record.¹⁰⁹ The applicant's counsel brought out on cross-examination that he had multiple convictions and had not revealed all of them on his second application for employment at Comanche Peak.¹¹⁰ He had not indicated any criminal record on his first application for employment.¹¹¹

The Board has considered this information in determining the weight it gives Mr. Stiner's testimony. The Board notes that, almost without exception, Mr. Stiner's allegations are duplicated by other witnesses. Also, the Board is not aware of any motive that Mr. Stiner would have to

¹⁰⁶ CASE Ex. 666A.

¹⁰⁷ Testimony of Darlene K. Stiner Witness for Intervenor CASE (Citizens Association for Sound Energy), CASE Ex. 667, at 3 (Tr. 4127).

¹⁰⁸ Id. at 3,5 (Tr. 4127, 4129).

¹⁰⁹ Testimony of Henry A. Stiner Witness for Intervenor CASE (Citizens Association for Sound Energy), CASE Ex. 666, at 47-48 (Tr. 4249-50).

¹¹⁰ Tr. 4488-89; App. Ex. 146.

¹¹¹ Tr. 4484, App. Ex. 145.

make allegations in this proceeding which he did not believe were true. If anything, the fact that Mr. Stiner's wife was employed at Comanche Peak at the time he testified would seem to provide him with a motive not to make allegations against the applicant.

The one allegation which was made by Mr. Stiner and by no one else was that he was terminated because he showed a quality assurance inspector a gouge in a pipe.¹¹² This allegation was not elaborated on to any significant extent by any of the parties. However, it is related to the question of management's commitment to quality control and, as such, it will be considered in a later decision.

Another concern raised by Mr. Stiner was that a hole was created in concrete in the Safeguards Building when he removed a partially installed Hilti bolt.¹¹³ Mrs. Stiner also observed the hole.¹¹⁴ Mr. Stiner alleged that repair of the hole was not subject to proper quality assurance control.¹¹⁵ The staff has investigated this allegation and reported its findings in Investigation Report 81-12.¹¹⁶ The investigation concluded that this allegation did not raise any safety

¹¹² H. Stiner Testimony, CASE Ex. 666, at 34, 40 (Tr. 4236, 4242).

¹¹³ Id. at 25 (Tr. 4227).

¹¹⁴ D. Stiner Testimony, CASE Ex. 667, at 40 (Tr. 4161).

¹¹⁵ H. Stiner Testimony, CASE Ex. 666, at 25 (Tr. 4227).

¹¹⁶ Staff Ex. 178.

questions.¹¹⁷ Because we have no reason to doubt the staff's evaluation of the significance of a hole in the wall of the Safeguards Building, we will not declare this a sua sponte issue.¹¹⁸

Mr. Stiner also alleged that he was not told that greater care should be taken because the facility was a nuclear plant.¹¹⁹ This allegation relates to the overall adequacy of the quality assurance program, but it is not by itself a cause for concern about the safety of the plant.

An allegation that was made by both Mr. and Mrs. Stiner was that pieces of scrap iron were added to hangers or supports in the field.¹²⁰ At least one of these allegations would appear to relate to Class 5 ("V") hangers,¹²¹ some of which may not be subject to the quality assurance system.¹²²

As to a Class III hanger mentioned by Mr. Stiner, he said that the heat number was added to a shim that had been made out of a scrap

117 Id. at 9.

118 We are concerned that the staff did not provide a reasoned explanation for its conclusion, but we do not see any reason to inquire further about this particular defect.

119 H. Stiner Testimony, CASE Ex. 666, at 32 (Tr. at 4234).

120 Id. at 41-42 (Tr. 4242-43); D. Stiner Testimony, CASE Ex. 667, at 47-48 (Tr. 4171-72).

121 H. Stiner Testimony, CASE Ex. 666, at 42 (Tr. 4244).

122 Tr. 4082, 4565.

metal.¹²³ According to rebuttal testimony by the applicant, use of new material is not required and traceability through heat numbers is only required for structural members used in component supports.¹²⁴ The shim is not a structural member. As far as Mrs. Stiner's allegation that she was directed to weld a piece of angle iron onto a small Class III support, she admitted that she does not know what happened to the support once it was taken from her. She did not know whether it was installed or scrapped.¹²⁵

None of these specific instances appears to be a problem. Therefore, the Board does not believe the Stiners' allegations in this regard raise serious health and safety questions about the plant which require the Board to raise this as a sua sponte issue.

The Stiners made numerous allegations about welding practices at Comanche Peak. They alleged that weave beading occurred although it was prohibited on site.¹²⁶ Weave beading involves welding using transverse oscillations of the electrode.¹²⁷ They further alleged that if weave beading welding violations occurred, the weld was improperly repaired.

¹²³ H. Stiner Testimony, CASE Ex. 666, at 41-42 (Tr. 4242-43).

¹²⁴ Applicant cited ASME Section III or ANSI B-31.1 as the applicable code sections. See Tr. 4628-29.

¹²⁵ D. Stiner Testimony, CASE Ex. 667, at 47-48 (Tr. 4171-72).

¹²⁶ Id. at 23-4, 28 (Tr. 4147-48, 4152).

¹²⁷ Tr. 4086.

Specifically, they alleged that repair of weave-beaded welds requires the grinding out and rewelding of the entire weld,¹²⁸ but that the practice of welders was to grind the surface of the weld which showed transverse oscillations and make only a surface welding pass.¹²⁹

The applicant presented rebuttal testimony that established that only welding which involved significant transverse oscillation was prohibited as weave beading. Brown and Root, the firm performing construction at Comanche Peak, defines this to mean oscillations greater than four times the diameter of the weld rod used.¹³⁰ Because some transverse oscillation is permitted at Comanche Peak as being acceptable under Section IX of the code of the American Society of Mechanical Engineers (ASME), some of the welds which concerned the Stiners may have been acceptable.

The NRC did an investigation of the allegations of weave beading. A visual inspection of an area in which this weave beading had allegedly occurred did not disclose weave welds.¹³¹ However, it would not have

128 D. Stiner Testimony, CASE Ex. 667, at 26 (Tr. 4150).

129 Id. at 25 (Tr. 4149); H. Stiner Testimony, CASE Ex. 666, at 9-10 (Tr. 4211-12); Tr. 4357.

130 Rebuttal Testimony of C. Thomas Brandt, Ronald G. Tolson, Gordon R. Purdy, Raymond J. Vurpillat and Randall D. Smith Regarding Quality Assurance/Quality Control, App. Ex. 141, at 30 (Tr. 4685); Tr. 4412, 4420, 4635-6.

131 Staff Ex. 178 at 5.

done so if the welds had been reworked as described by the Stiners.¹³² Conversations by the investigator with five welders revealed that three had seen weave welds but that those welds had been corrected.¹³³

The applicant presented testimony that the repair method described by the Stiners did not violate any procedures.¹³⁴ The witness testified that by the time the weld has been ground down, it no longer exceeds the allowable diameter.¹³⁵ However, we are unable to accept this explanation because we fail to understand the engineering principles involved here. In particular, we do not understand the configuration of the joints in which weave beading occurred, where the grinding takes place or how the grinding cures the underlying weakness in the joint due to excess transverse oscillation during welding. Hence, we consider this to be an open item.

The Stiners alleged that "plug welds" were used to fill improperly placed bolt holes and that this was not a permissible procedure.¹³⁶ The applicant's witnesses testified that this procedure was permitted for filling misdrilled holes at Comanche Peak and that this work requires a

¹³² Tr. 4599.

¹³³ Staff Ex. 178 at 5.

¹³⁴ Tr. 4650-51.

¹³⁵ Id.

¹³⁶ D. Stiner Testimony, CASE Ex. 667, at 30 (Tr. 4134); H. Stiner Testimony, CASE Ex. 666, at 43-44 (Tr. 4219-20).

final visual inspection by quality assurance.¹³⁷ An NRC investigation of this allegation found that plug welding occurred and that quality control inspectors were aware that they were required to inspect it.¹³⁸ Mr. Stiner, however, specifically stated that these welds are being made without quality assurance inspecting them.¹³⁹ Neither the applicant nor the staff appear to have addressed the question of whether such welds are being made and not being inspected. Nor have we been able to find the ASME code provisions that may allow this practice. Hence, the allegation is an open item.

Mr. Stiner alleged that downhill welding sometimes occurred, in violation of site procedures.¹⁴⁰ The applicant's rebuttal panel testified that although Brown and Root procedures may have prohibited downhill welding at Comanche Peak, it is allowed by ASME Section 9 for root and cover pass and is allowed by the American Welding Society (AWS) to repair undercut.¹⁴¹ The record does not specify whether the Stiner allegations were limited to root and cover pass welds. Consequently,

¹³⁷ Applicant's Rebuttal Panel Testimony, App. Ex. 141, at 36 (Tr. 4691).

¹³⁸ Staff Ex. 178 at 6.

¹³⁹ H. Stiner Testimony, CASE Ex. 666, at 19 (Tr. 4221).

¹⁴⁰ Id. at 44-45 (Tr. 4246-47).

¹⁴¹ Tr. 4601-02.

the record explanation of the allegation is incomplete and this is an open item.

Both of the Stiners alleged that there were problems with the control of welding rods. Mrs. Stiner stated that, while these rods were supposedly controlled and accounted for through the use of stubs that assigned rods to a particular welder for a particular job, she had discovered rods which had been abandoned or thrown out without the control system having identified the problem.¹⁴² She also stated that there were instances when welders claimed to have used more welding rods than would be needed for a particular job.¹⁴³ Thus, welders could have claimed to have used rods, kept them, and later used them on a weld for which they had not been issued and might be inappropriate. Mr. Stiner testified that he had performed welding using rods which had been issued to other welders.¹⁴⁴

The applicant, in rebuttal to the Stiners' allegation, presented testimony that weld rods were controlled to assure that safety-related weld rods of a proper type were used for a specific application.¹⁴⁵ The panel stated that some NCRs had been written when these procedures were

142 D. Stiner Testimony, CASE Ex. 667, at 41 (Tr. 4165).

143 Id.

144 H. Stiner Testimony, CASE Ex. 666, at 19 (Tr. 4221).

145 Applicant's Rebuttal Panel Testimony, App. Ex. 141, at 34 (Tr. 4689).

not followed.¹⁴⁶ (Mrs. Stiner herself identified one such NCR that she had written.)¹⁴⁷

This testimony is not sufficient to resolve the issue. The fact that NCRs have been written on uncontrolled weld rods does not refute a charge that the control system for these rods, while present, is less than perfect. Neither the staff nor the applicant has presented evidence that the system is so effective that we may conclude that almost all (or all) of the breaches are corrected by the quality control system. This is an open item. There appears to be no way to clarify the scope of this problem without a field investigation.

It was also alleged that it was a common practice for welders to leave unplugged for prolonged periods the containers which were intended to keep weld rods heated.¹⁴⁸ The purpose of keeping the rods heated is to prevent the welding rods from absorbing moisture.¹⁴⁹ If the rods do absorb moisture, the moisture will escape as steam during the welding. This will cause surface porosity.¹⁵⁰ (Porosity is holes or voids made

¹⁴⁶ Id. at 35 (Tr. 4690).

¹⁴⁷ CASE Ex. 667S.

¹⁴⁸ D. Stiner Testimony, CASE Ex. 667, at 39 (Tr. 4163).

¹⁴⁹ Tr. 4597.

¹⁵⁰ Tr. 4302, 4597.

in a weld by escaping steam.)¹⁵¹ Porosity is a visual inspection criterion for welds under the American Welding Society code.¹⁵² If unheated rods cause welds with porosity, the weld must be inspected and repaired.¹⁵³ This will solve the problem caused by the unheated rod. Thus, this allegation involves construction practices rather than quality assurance and it involves practices which would not affect the safe operation of the facility.

The Board asked the applicant how welding in safety-related buildings would be verified prior to operation of the nuclear plant. In describing the welding verification process, the applicant stated that all Class I, II, III and V supports in safety-related areas will be examined on a case-by-case basis prior to turnover to the operations group.¹⁵⁴ The process includes looking for evidence in the inspection record that there was a final visual inspection and other inspections that were required to be performed on all pipe and equipment

151 Tr. 4631.

152 Tr. 4632. Porosity is not a criterion for inspections performed to the ASME code. Id.

153 Applicant's Rebuttal Panel Testimony, App. Ex. 141, at 35 (Tr. 4690); Tr. 4597.

154 Tr. 4646-48.

supports.¹⁵⁵ The Board concludes that this voluntary action of the applicant is important to assure the integrity of these supports.

The Stiners also alleged that adequate quality control was not maintained over torquing of Hilti bolts. The quality assurance inspector is supposed to observe the torquing of Hilti bolts and to apply a material known as Torque Seal after the proper torquing has occurred. (Inspection is not required for 100 percent of Hilti bolt torquing, but that is the goal of the program.)

The Stiners alleged that quality control inspectors performing a Hilti bolt inspection would not always stand where they could observe the actual torquing;¹⁵⁶ that Torque Seal, whose handling was supposed to be controlled, was improperly in the hands of craft workers;¹⁵⁷ and that Torque Seal had been found on Hilti bolts that had not been properly torqued.¹⁵⁸ The applicant's response in this area was that it was not necessary for the inspector to observe the actual torquing of a Hilti bolt if the inspector checks the torque wrench for a proper setting,

155 Id.

156 D. Stiner Testimony, CASE Ex. 667, at 34 (Tr. 4158); H. Stiner Testimony, CASE Ex. 666, at 23 (Tr. 4225); Tr. 4299-4300.

157 D. Stiner Testimony, CASE Ex. 667, at 31 (Tr. 4155).

158 Id. at 36 (Tr. 4160); CASE Ex. 667R.

hears the click indicating that the bolt has been torqued, sees the craft person doing the torquing, and has no room to be in position to see the torquing indicator on the wrench.¹⁵⁹ The applicant's panel admitted that it was likely that the possession of Torque Seal was not entirely limited to quality assurance personnel, in spite of attempts to control it.¹⁶⁰ The applicant argued that this was not a cause for concern, however, because final verification of Hilti bolt torquing is dependent on a review of quality assurance inspection records.¹⁶¹

The Board finds that there is no problem with the nature of the quality assurance inspections performed on Hilti bolts.¹⁶² The Board is concerned, however, that Mrs. Stiner understood her instructions to be that she should assume that all Torque Seal had been applied by quality assurance and that she should sign her inspections on that basis.¹⁶³ If quality control inspectors signed inspections because they found Hilti bolts covered with Torque Seal, the paper review of inspections would not reveal the fact that quality assurance had not actually checked

¹⁵⁹ Applicant's Rebuttal Panel Testimony, App. Ex. 141, at 32-33 (Tr. 4687-88); Tr. 4537-9.

¹⁶⁰ Tr. 4534, 4536.

¹⁶¹ Applicant's Rebuttal Panel Testimony, App. Ex. 141, at 33 (Tr. 4688); Tr. 4541-42, 45-44.

¹⁶² See also Staff Ex. 178 at 7-8.

¹⁶³ Tr. 4085.

whether the Hilti bolt had been torqued. Consequently, this is an open item. There needs to be further evidence, based on field investigation, concerning whether quality control inspectors considered the presence of Torque Seal to be so definitive that they did not check quality assurance records further.

Mrs. Stiner alleged that an NCR which she had written on a burned bus box adjacent to the polar crane rail and resulting in gouges in the polar crane rail was unfairly voided.¹⁶⁴ The disposition of the NCR was that it was voided because its subject was not an item covered by the quality assurance program.¹⁶⁵ There is no evidence that the bus box in question is safety-related, so there is no reason for us to declare a sua sponte issue.

Mrs. Stiner made several other allegations to which the staff and applicant have not responded. Some of them are reasonably specific and are open questions. These include her allegations that Hanger #SW-1-102-106-Y33K is in a safety-related area and is severely mismatched;¹⁶⁶ that a craft person was involved in performing quality assurance liquid penetrant inspections on the fuel pool liner;¹⁶⁷ and

¹⁶⁴ D. Stiner Testimony, CASE Ex. 667, at 53 (Tr. 4177); Tr. 4073, 4102.

¹⁶⁵ Id. at 54 (Tr. 4178).

¹⁶⁶ Id. at 45 (Tr. 4169).

¹⁶⁷ Id. at 49 (Tr. 4173).

that ineffective action was taken when she identified numerous problems on a hanger previously approved by quality assurance.¹⁶⁸

Two allegations made by Mrs. Stiner may simply be dismissed without further consideration. She alleged that there is no traceability of materials until quality assurance becomes involved.¹⁶⁹ Applicant argues that traceability is only required for the quality assurance program and that it need not be applied to materials that are not covered by that program. In this posture, there is some ambiguity in the record, but we conclude that there is only one logical explanation for that ambiguity. Theoretically, it is possible that items that had not previously been traced could be added to the quality assurance system, where they would then become traceable. However, we exclude this inference because testimony that items in the program are traceable means that their entire pedigree must be known. Those items could not previously have been untraceable. On this basis, we accept applicant's explanation.¹⁷⁰

The second allegation is that material from a scrap bin could be utilized on the site and would lack traceability.¹⁷¹ Since there is no

¹⁶⁸ Id. at 56-57 (Tr. 4180-81).

¹⁶⁹ Id. at 46 (Tr. 4170).

¹⁷⁰ A party with information that our resolution of this issue is factually in error would have an obligation to correct the record, even if our finding were favorable to its interests.

¹⁷¹ Id. at 57 (Tr. 4181).

allegation this has happened, it raises no issue about the quality of actual construction at Comanche Peak.

Mrs. Stiner alleged that she was unqualified for a quality assurance position which she held.¹⁷² The CAT report discusses inspector qualification and this allegation will be considered in connection with our decision on matters in the CAT report.

Mrs. Stiner alleged that management at Comanche Peak had harassed her because she would be testifying for the intervenors in this proceeding.¹⁷³ This is related to a matter considered in the CAT report and reflects on management's commitment to its quality assurance program. It will be evaluated in a subsequent decision.

5. Allegations by Charles A. Atchison

Charles A. Atchison was employed by Brown & Root to work on the Comanche Peak site from February 27, 1979 to April 12, 1982.¹⁷⁴ He testified in these proceedings on behalf of CASE. Among his many allegations, Mr. Atchison claimed that he was improperly fired for performing inspections.¹⁷⁵ This allegation has been covered by a

¹⁷² Id. at 8 (Tr. 4132).

¹⁷³ Id. at 63-72 (Tr. 4187-96).

¹⁷⁴ Testimony of Charles A. Atchison, Witness for Intervenor CASE, Case Ex. 650, at 5-7.

¹⁷⁵ See, e.g., id. at 53-54.

previous Memorandum and Order of this Board.¹⁷⁶ That decision found that Mr. Atchison was improperly fired.

The allegations not covered in either of our decisions include the following: 1) problems with welding on Chicago Bridge and Iron pipe whip restraints and moment restraints;¹⁷⁷ 2) problems with welding on NPSI pipe whip restraints;¹⁷⁸ 3) uncertified employees performed liquid penetrant testing;¹⁷⁹ 4) unstated management direction to overlook problems;¹⁸⁰ 5) and pressure to approve an audit of Tennessee Wall, Tube and Metal.¹⁸¹ These appear to be open issues. Issue number 4 is the subject of two ongoing investigations, which may also cover number 5.

Other Atchison allegations are vague, unrelated to the quality assurance program, or are speculative. These allegations, which are not treated in detail in this opinion, are that 1) the quality control

¹⁷⁶ LBP-83-34, 18 NRC _____, July 6, 1983.

¹⁷⁷ Atchison Testimony, Case Ex. 650, at 23-24, 40-41; Supplementary Testimony of Charles A. Atchison Witness for Intervenor CASE (Citizens Association for Sound Energy), CASE Ex. 656, at 2-3, 5-6.

¹⁷⁸ Atchison Testimony, CASE Ex. 650, at 33.

¹⁷⁹ Id. at 51.

¹⁸⁰ Id. at 58.

¹⁸¹ Atchison Supp. Testimony, CASE Ex. 656, at 2.

vault may not be fireproof;¹⁸² 2) there is low morale among workers;¹⁸³ 3) he was not instructed to use special care because he was working on a nuclear facility;¹⁸⁴ 4) Japanese steel was being used on site;¹⁸⁵ 5) pictures he had found in a desk on site showed a void at an unspecified location in Reactor Building 1;¹⁸⁶ 6) an individual, employed as a contractor's quality assurance manager, ordered for Brown and Root;¹⁸⁷ and 7) engineering permitted a type of welding by NPSI not authorized by procedures.¹⁸⁸

Among Mr. Atchison's more substantial concerns is the allegation that there were problems with getting component modification cards to the document control center and incorporating them into appropriate document revisions.¹⁸⁹ This allegation is related to matters discussed in the CAT report and will be discussed later in that context.

Mr. Atchison alleged that A490 bolts were being broken and that after tests were run to establish torque values for the bolts, the new

182 Atchison Testimony, CASE Ex. 650, at 34.

183 Id. at 49, 64.

184 Id. at 67.

185 Atchison Supp. Testimony, CASE Ex. 656, at 1-2.

186 Id. at 7.

187 Id. at 9.

188 Id. at 8.

189 Atchison Testimony, CASE Ex. 650, at 35-36.

torque values were not incorporated into site procedures.¹⁹⁰ Neither the applicant nor the staff has responded to the allegation. It is an open item.

Another allegation made by Mr. Atchison was that he had observed a welder "quenching" a weld directly, in violation of site procedures.¹⁹¹ It appears from Mr. Atchison's testimony that he wrote an NCR on this matter and that the project engineer determined that, while the quenching violated site procedures, it did not affect the quality of the weld.¹⁹² However, we have no understanding of the reason for prohibiting the quenching of welds or why this particular weld was found to be acceptable.

Mr. Atchison alleged that a flammable lubricant was used to assist in pulling cable through electrical conduit.¹⁹³ The lubricant was tested in a laboratory and found to be satisfactory. Without having been present for the laboratory test, Mr. Atchison questioned whether it reasonably approximated conditions in the field.¹⁹⁴ In essence, Mr. Atchison gave no reason for questioning the accuracy of the results of

190 Id. at 29-31.

191 Id. at 50-51.

192 Id. at 50.

193 Id. at 55.

194 Id. at 55-56.

the laboratory tests. We find nothing in this allegation which we should pursue sua sponte.

Mr. Atchison also alleged that there were too few quality control inspectors to perform the quality assurance work at Comanche Peak.¹⁹⁵ Applicant provided rebuttal testimony indicating that during the time Mr. Atchison was employed at Comanche Peak, the ratio of quality control inspectors to craft personnel was within the average for the industry.¹⁹⁶ In addition, the applicant's witnesses testified that if the ratio had been less favorable it could have influenced how rapidly required inspections were performed, but would not have affected whether they were performed.¹⁹⁷ Accepting the applicant's testimony that the inspections will be performed regardless of the number of inspectors, Mr. Atchison's allegation does not by itself raise an important issue about the number of inspectors. We do not decide whether the parallel issue raised by the CAT inspectors is meritorious.

Mr. Atchison alleged that hundreds of flange bolt-up joints had not been submitted to quality assurance for final inspection. Thus, he alleged the start-up group would repeatedly disassemble and reassemble

¹⁹⁵ Id. at 57.

¹⁹⁶ Applicant's Rebuttal Panel Testimony, App. Ex. 141, at 38-39 (Tr. 4693-94).

¹⁹⁷ Id.

the joints.¹⁹⁸ Certainly, if the units are to be disassembled, this should be done before the final quality assurance approval. It does not appear that Mr. Atchison is alleging that these joints will never be submitted for final quality assurance approval. They appear to be just one additional item left for inspection during the final walk-down at the end of the project.

Mr. Atchison alleged that he had observed the "cold springing" of two lines from reactor coolant pump compartment number three.¹⁹⁹ In rebuttal, the applicant indicated that the cold sprung pipe was part of the component cooling water system, that an NCR had been written on it, and that repair work had been required.²⁰⁰ Mr. Atchison was reasonably specific about the lines he alleged had been cold sprung. The applicant did not indicate how they determined that the lines to which he referred were not part of the reactor cooling system. They may well be correct in their conclusion; however, there is an important gap in our record that needs to be filled.

Mr. Atchison's final allegation was that minimum wall thickness violations had occurred in piping.²⁰¹ He testified that an NCR had been

¹⁹⁸ Atchison Testimony, CASE Ex. 650, at 62.

¹⁹⁹ Id. at 63.

²⁰⁰ Applicant's Rebuttal Panel Testimony at 36-37 (Tr. 4691-92).

²⁰¹ Atchison Testimony, CASE Ex. 650, at 63.

written on this matter and had led to two backfit programs.²⁰² As far as he knew the NCR had not been closed.²⁰³ Since an NCR had been written on the problem and there are controls requiring that there be an appropriate disposition, we find that this allegation demonstrates the correct working of the quality assurance program and does not present an allegation that we should pursue sua sponte.

6. Miscellaneous Allegations

a) Lobbin Report

Mr. B. R. Clements, Vice President, Nuclear of TUGCO commissioned a management study by Mr. Frederick B. Lobbin, to review the effectiveness of management controls within the quality assurance organization.²⁰⁴ This review was entirely voluntary on TUGCO's part.²⁰⁵ It was a quick-and-dirty effort to identify problems that Mr. Clements might

²⁰² Id. at 63-64.

²⁰³ Id. at 64.

²⁰⁴ See App. Ex. 48; Testimony of B. R. Clements Regarding Reviews of Management Control Program and Activities of Texas Utilities Company Quality Assurance Organization, App. Ex. 118, at 2-3; Testimony of Frederick B. Lobbin Regarding Review of Management Control Program and Activities of Texas Utilities Generating Company QA Organization, App. Ex. 119, at 2; Clements, Tr. 2156; Lobbin Tr. 2163-64.

²⁰⁵ B. R. Clements Testimony, App. Ex. 118, at 3; F. Lobbin Testimony App. Ex. 119, at 2. See also 10 CFR Part 50, Appendix B which does not require any such management study.

follow up if he thought additional effort was warranted. Clements at 3-5.

Mr. Lobbin testified that he sometimes overstated his conclusions in order to assure that they would be attended to.²⁰⁶ Despite this method of exaggeration, each of his findings was evaluated by applicant in a response document.²⁰⁷

We conclude that as a result of the nature of Mr. Lobbin's study, his individual findings are entitled to little weight in this proceeding. This conclusion does not prejudice the right of a party to use his findings as cumulative evidence, together with other direct evidence, of positive or negative findings concerning the quality assurance program.

b) The Number of NCRs

CASE introduced a large number of documents that demonstrated the existence of construction deficiencies at Comanche Peak.²⁰⁸ However, there were no witnesses that testified that the number of deficiencies was abnormal. Indeed, the staff's resident inspector, Mr. Taylor, testified without contradiction that the number of NCRs indicates only

²⁰⁶ Lobbin, Tr. 2170.

²⁰⁷ App. Ex. 49.

²⁰⁸ See, e.g., CASE Ex. 305-570.

that the quality assurance program is working.²⁰⁹ In addition, the staff examined a sample of NCRs to detect trends indicative of problems, and they have concluded that there are no serious problems revealed by the logs of NCRs.²¹⁰ Staff examination of corrective actions taken pursuant to NCRs also resulted in a positive evaluation.²¹¹

We find no evidence that the number of NCRs and of other deficiency reports was in any way excessive for a project of this size. To the contrary, the existence of these reports is consistent with the Commission's quality assurance requirements.

²⁰⁹ Taylor, Tr. 1712, 1730-31.

²¹⁰ Stewart, Tr. 1282, 1285; Crossman, Tr. 3021.

²¹¹ Crossman, Tr. 3022.

II. Contention 22

Contention 22 states:

Applicants have failed to comply with 10 CFR Part 50, Appendix E, regarding emergency planning for the following reasons:

- (a) The FSAR does not identify state or regional authorities responsible for emergency planning or who have special qualifications for dealing with emergencies.
- (b) No agreements have been reached with local and state officials and agencies for the early warning and evacuation of the public, including the identification of the principal officials by titles and agencies.
- (c) There is no description of the arrangements for services of physicians and other medical personnel qualified to handle radiation emergencies and arrangements for the transportation of injured or contaminated individuals beyond the site boundary.
- (d) There are no adequate plans for testing by periodic drills of emergency plans and provisions for participation in the drills by persons whose assistance may be needed, other than employees of the Applicant.
- (e) There is no provision for medical facilities in the immediate vicinity of the site, which includes Glen Rose.
- (f) There is no provision for emergency planning for Glen Rose or the Dallas/Fort Worth metroplex.²¹²

CASE did not address this contention at all in its proposed findings of fact. In recent hearings CASE has had very few questions for

²¹² Order Subsequent to the Prehearing Conference of April 30, 1980, slip op. at 11 (June 16, 1980) (unpublished).

witnesses on emergency planning.²¹³ CASE's failure to file proposed findings on the emergency planning contention when directed to do so constitutes abandonment of the contention.²¹⁴ CASE subsequently has failed to pursue the contention vigorously, confirming the wisdom of declaring this to be an abandonment.

The development of emergency plans is an evolutionary process. In May 1983, the staff introduced into the record an interim finding by the Federal Emergency Management Agency (FEMA) that there is reasonable assurance that the off-site protection of public health and safety is adequate.²¹⁵ The documentation attached to this interim finding makes it apparent, however, that the state and county emergency plans do have deficiencies.

The interim finding is based upon a review of the paper plans.²¹⁶ The finding is in the nature of a progress report.²¹⁷ It indicates that if all the commitments made in the emergency plans are carried out,

213 Tr. 7286, 7480-81.

214 10 C.F.R. § 2.754(b).

215 Memorandum from Lee M. Thomas to William Dircks (September 29, 1982), ff. Tr. 7414.

216 Tr. 7417-18.

217 Tr. 7456.

there is reasonable assurance that the plans will provide adequate protection for the public.²¹⁸

At this stage, it is too early to determine whether all those commitments will be fulfilled. The Board is not satisfied that the plans as presently constituted are adequate. It remains concerned about these promises. Since the evolutionary process is not yet complete (there must, for example, be a drill or exercise),²¹⁹ the Board does not believe it should raise any issues sua sponte at this time. However, the Board will continue to observe the development of the emergency plans and may raise issues sua sponte later if the commitments are not met or the deficiencies are not rectified. Our Order of June 27, 1983, elaborates further about the extent of our concern about this issue.

III. Board Questions

In addition to the contentions, the Board had posed four questions. These questions were posed for the purpose of obtaining information so that the Board could determine whether a serious health or safety issue existed which the Board should raise sua sponte. This decision resolves those aspects of these Board questions that were raised during hearings occurring prior to March 1983.

²¹⁸ Tr. 7452-4.

²¹⁹ Tr. 7416-17, 7441-3, 7481.

A. Board Question 1

In Board Question 1 the applicant and staff were asked to "[d]escribe in detail the planned method for handling any hydrogen gas in the CPSES containment structure."²²⁰ The potential source of hydrogen gas in the containment structure would be a Loss-of-Coolant Accident (LOCA). Combustible gases, principally hydrogen, would be generated inside the containment during a LOCA by: a zirconium-water reaction, release of free hydrogen from the primary coolant system, radiolysis of water, or corrosion of susceptible construction materials in containment.²²¹ As it has previously indicated on the record,²²² the Board is satisfied that any hydrogen generated within the containment structure can be satisfactorily handled. The Board relies on the large containment structure at Comanche Peak, the redundancy of electrical recombiners provided, and the requirement by the staff that the recommendations for operator training found in the TMI-2 Short Term Lessons Learned report will be implemented prior to issuance of the operating licenses.²²³

²²⁰ Order Subsequent to the Prehearing Conference of April 30, 1980, slip op. at 4 (June 16, 1980) (unpublished).

²²¹ Final Safety Analysis Report (FSAR) §§ 6.2.5 & 6.2.5A.

²²² Tr. 693, 731.

²²³ See Board Ex. 1; Tr. 730-31.

B. Board Question 2.

Board Question 2 states:

Applicant and staff should describe in detail the operating quality assurance program for CPSES. A description of the provisions for conduct of quality control audits should be provided, including a description of how reactor operations and reactor operator training will be audited.²²⁴

The applicant and the staff provided the Board with extensive information on the structure and purpose of the quality assurance program for operations at Comanche Peak.²²⁵ The Board is convinced that if the operational quality control program is instituted as described, it will function adequately. The Board notes that while specific implementing procedures were not provided to the Board, the staff will review them before it will issue the licenses.²²⁶ The staff will also audit implementation of the operational quality assurance program.²²⁷ In light of the commitments made by the applicant and the staff, the Board

224 Order Subsequent to the Prehearing Conference of April 30, 1980, slip op. at 5 (unpublished).

225 Testimony of B. R. Clements Regarding Management Commitment to Quality Assurance, App. Ex. 8; Testimony of David N. Chapman Regarding the Operating Quality Assurance Program for Comanche Peak, App. Ex. 9; Testimony of R. A. Jones Regarding Commitment of On-Site Management to Quality Assurance, App. Ex. 10; Testimony of Antonio Vega Regarding Provisions for Conduct of QA Audits and Reactor Operator Training, App. Ex. 12; staff Testimony of John G. Spraul Regarding Operating Quality Assurance (Board Question No. 2), Staff Ex. 5; App. Ex. 11; Tr. 506-662.

226 Tr. 657-58, 662.

227 Tr. 656.

is satisfied at this time that the Board need not pursue this matter further by raising it as a separate, sua sponte issue.²²⁸

C. Board Question 3

Board Question 3 asked the applicant and the staff to describe the status of the resolution of Safety Issue TAP-9 (Anticipated Transient Without Scram or ATWS) as it relates to Comanche Peak. The staff answered the Board question with three affidavits.²²⁹ The staff noted that the Commission has issued a notice of rulemaking on ATWS.²³⁰ Prior to operation of Comanche Peak, the applicant will be required to develop emergency procedures and to train its operators to recognize and cope with an ATWS event. The staff indicated that the scram systems were redundant and highly reliable and that in view of favorable operating experience, Comanche Peak could be operated without undue risk during the period pending the final ATWS rule.

With respect to the favorable experience, Mr. Pyatt stated that, "There have been roughly one thousand reactor years of experience accumulated in foreign and domestic commercial light-water-cooled

228 This conclusion would not prevent us from renewing our concern about operations quality assurance should we ascertain that there have been substantial deficiencies in aspects of the construction quality assurance program that also are present during operations.

229 Affidavits by David W. Pyatt, James W. Clifford and Marvin W. Hodges, dated May 5, 1982. (Bd. Ex. 3).

230 46 Fed. Reg. 57521 (1981).

reactors without an ATWS accident." He chose his words carefully to avoid having to mention that there had been at least one ATWS event.

Although the Board had considered the staff's response on ATWS to be satisfactory,²³¹ we note that on February 25, 1983, a potentially serious ATWS event occurred at Salem Unit 1 as a result of a failure of redundant reactor trip breakers.²³² After that event, we asked whether the reactor trip breakers at Comanche Peak were similar to the Salem breakers and whether there would be any new requirements prior to operation. The staff has informed us that a task force has been formed to look into the generic implications of the Salem event and that final actions in response to the event are still under consideration. Consequently, we are not yet satisfied concerning the need to declare ATWS to be a sua sponte issue.

D. Boron Injection Tank

When the Emergency Core Cooling System at Comanche Peak is activated, high-head pumps²³³ take borated water from the refueling water storage tank and inject that water into the reactor cooling system. The original design called for the insertion of a Boron

²³¹ Tr. 693.

²³² Memorandum from Darrell G. Eisenhut to Chairman Palladino, et al. (March 3, 1983) (Board Notification 83-26 - Failure of Reactor Trip Breakers to Open in Trip Signal).

²³³ Pumps designed to inject into the primary cooling system when it is fully pressurized.

Injection Tank (BIT) between the high-head pumps and the reactor cooling system. The Applicant proposes to omit the BIT.²³⁴ The Board inquired into the appropriateness of the deletion.²³⁵

The concentration of Boron in the refueling water storage tank is 0.2%; the concentration of boron in the BIT would have been 12%. Such a high concentration of boron would require that the tank and all lines and valves of the BIT be kept at high temperature to prevent the precipitation of boron crystals in the BIT and the consequent plugging of valves and lines which connect the high pressure injection system (HPIS) to the primary coolant system, a potential hazard to the operation of the ECCS system during a transient.

Representatives from Westinghouse have informed the staff that the BIT was included in the original design for the sole purpose of mitigating the consequences of a steam-line break accident. They have made an analysis of a worst case scenario, a large steam-line break when the reactor is just critical, at zero power and at operating temperature. In this scenario, the secondary system would rapidly depressurize causing rapid cooling of the primary system, an increase in reactivity above critical (due to more optimal moderation at the reduced

²³⁴ The description of the BIT system and its effectiveness in reducing the transient following a steam-line break is taken chiefly from the affidavit of staff witness Sammy Diab (following Tr. 781) and the attached "Summary of Meeting on Comanche Peak Design Change and Responses to RSB Questions."

²³⁵ Order of April 2, 1982 at 2-3.

temperature) and a return to power production in the core. The reduction in primary coolant temperature and pressure would trip the safety injection signal and initiate the pumping of borated water into the core. If there is a BIT, the power would peak²³⁶ at about 15% of full power and then gradually decrease as the boron reduces the reactivity. Without the BIT the power would peak at about 20% of full power and persist somewhat longer.²³⁷

Applicant, with support from the staff, has argued that this increase in power without the BIT is not significant. It relies on Westinghouse calculations that show that the DNBR (departure from nucleate boiling ratio) would remain above 2.5, indicating a wide margin of safety before the coolant would reach a "film" condition which would interfere with the safe removal of heat from the core.

Although applicant and staff support deletion of the BIT in order to reduce the risk that boron crystals might interfere with ECCS operation, neither identified an instance where the ECCS had been compromised due to precipitation of boron.²³⁸ The witnesses stated,

236 The main steam-line break incident is analyzed using a conservative assumption that the control rods for the most reactive section of the core do not insert. Most of the power that is generated comes from this one section.

237 Figures 3-4 and 3-5 in Attachment 1 to the Testimony of S. Diab, following Tr. 781.

238 Tr. 746; Tr. 783.

generally, that there have been operational problems with the BIT.²³⁹ However, the Board is independently aware that there have been boron-crystallization events of sufficient seriousness to be called precursors to potentially severe core damage accidents.²⁴⁰

We agree with applicant and staff that on balance the Comanche Peak Station apparently would be safe without the BIT. However, we are concerned that the NRC staff has relied entirely on the Westinghouse analyses.²⁴¹ We recognize that the matter also has been brought to the attention of the Advisory Committee on Reactor Safeguards (ACRS); however, the staff's reliance on the Westinghouse analyses was not brought out²⁴² and is a matter of concern to us. We request the staff to bring this matter to the attention of the ACRS once again, clearly indicating that the staff relies entirely on Westinghouse analyses of DNBR.

239 Tr. 778 and 782, staff; Tr. 746, applicant.

240 Science Applications Incorporated and Oak Ridge National Laboratory, NUREG CR-2497, Precursors to Potential Severe Core Damage Accidents: 1969-1979 (A Status Report) (June 1982) at Appendix C, pp. C-9 to C-10.

241 Tr. 782.

242 Advisory Committee on Reactor Safeguards, 259th Annual Meeting (November 13, 1981), Tr. 360-361, 9. See also staff presentations of November 11 and 13, found appended to the ACRS transcript.

O R D E R

For all the foregoing reasons and based on consideration of the entire record in this matter, it is this 29th day of July 1983

ORDERED:

1. This is a proposed decision.
2. Pursuant to the Board's authority to require the filing of Findings of Fact, objections to this decision are waived unless they are filed in compliance with the format requirements prescribed near the beginning of the accompanying memorandum.
3. Objections to this decision must be received within 22 days of issuance of this Order.
4. Replies to objections must meet the same specificity requirements applicable to the objections themselves. In particular, they must clearly state what they are replying to and provide a reasoned, documented discussion that responds directly.
5. Replies must be filed within ten days of receipt of the objection being replied to.

FOR THE
ATOMIC SAFETY AND LICENSING BOARD

Peter B. Bloch

Peter B. Bloch, Chairman
ADMINISTRATIVE JUDGE

Walter H. Jordan by PBB

Walter H. Jordan
ADMINISTRATIVE JUDGE

Kenneth A. McCollom by PBB

Kenneth A. McCollom
ADMINISTRATIVE JUDGE

Bethesda, Maryland