



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

**MAY 10 1991**

U.S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, D.C. 20555

Gentlemen:

In the Matter of the Application of ) Docket Nos. 50-390  
Tennessee Valley Authority )

WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - QUALITY ASSURANCE (QA) ADDITIONAL RECORDS REVIEW

The purpose of this letter is to address NRC's comments on TVA's Additional Systematic Record Review submittal in NRC letter to TVA dated March 20, 1991.

NRC's comments were discussed in a teleconference between representatives of NRC and TVA on March 11, 1991. TVA's response to NRC comments includes consideration of the results of that discussion. NRC comments and TVA responses are provided in the enclosure.

If there are any questions, please telephone P. L. Pace at (615) 365-1824.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

  
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Enclosures  
cc: See page 2

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U.S. Nuclear Regulatory Commission

**MAY 10 1991**

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## ENCLOSURE

WATTS BAR NUCLEAR PLANT UNIT 1  
RESPONSE TO NRC'S MARCH 20, 1991 LETTER TO TVA  
CORRECTIVE ACTION PROGRAM ON QUALITY ASSURANCE (QA) RECORDS

NRC Comment

1. The third paragraph of the cover letter refers to adjusting population acceptance criteria to reflect the significance of various types of records. This concept is reflected in the table on page 7 of the Additional Systematic Record Review (ASRR) document, and we have the following concerns with the table:
  - a. The table shows 3 record categories: 1) Required by regulation, 2) Permanent, and 3) Non-permanent. We believe that the 209 record categories in ANSI/ASME Standard N45.2.9 are "required by regulation," whether they are permanent or non-permanent. The applicable regulation, Appendix B of 10 CFR 50, states: "Sufficient records shall be maintained to furnish evidence of activities affecting quality." It then goes on to give examples: "The records shall include at least (underline added) the following: Operating logs and the results of reviews, inspections, tests, audits, monitoring of work performance, and materials analysis. The records shall also include closely related data such as qualifications of personnel, procedures, and equipment." We should know specifically which, if any, of the 209 record categories in N45.2.9 are considered by TVA as not being "required by regulation."
  - b. Section 2.2.2 of N45.2.9 states that non-permanent records are required to show evidence that an activity was performed in accordance with the applicable requirements but need not be retained for the life of the item. Further, the retention period for records generated prior to commercial operation does not begin until the date of commercial operation. At the time of licensing, many of the non-permanent records are as important to the licensing process as are permanent records. To specify a more liberal acceptance criterion for non-permanent records, prior to licensing, may not be in the best interest of the ASRR.
  - c. We believe the acceptance criteria should be specified for 1) primary type deficiencies and for 2) primary plus secondary type deficiencies. For example, we do not think that it should be acceptable for a non-permanent record type to be considered acceptable with 3 primary and 5 secondary deficiencies in a sample of 60 as the table now indicates.

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Based on the above, we suggest that an acceptable alternative to the table on page 7 of the ASRR would be to establish the following acceptance criteria (95 percent confidence) for each of the 209 record categories in N45.2.9:

<u>Deficiency Type</u>	<u>Acceptance Criteria</u>
Primary	5 Percent
Primary Plus Secondary	10 Percent

We note that the staff found acceptable, for the Quality of Construction Reinspection/Document Review of Comanche Peak, the conclusion "that a 95/5 sample plan, when used in the context of homogenous population of attributes, would provide a reasonable screen to detect programmatic or systematic deficiencies."

TVA Response

1. The categorization of record types described in the ASRR document was provided to consider grading of records based on their significance. TVA believed there was justification in using the rationale provided in the submittal based on information previously provided by NRC in a letter dated October 30, 1990, and also based on the differentiation of records types contained in ANSI N45.2.9.

With respect to the acceptance criteria, TVA agrees that differentiation of records categories as was shown in the ASRR document may not be beneficial and may in fact cause confusion. Therefore, TVA agrees to use one set of acceptance criteria for all ANSI record types. However, TVA considers that the combination of primary and secondary deficiencies in the acceptance criteria for 95/10 to be inappropriate due to the administrative nature of secondary deficiencies and their insignificant impact on the substantive attributes of the record. In reviewing this matter with NRC during our March 11, 1991 teleconference, TVA committed to the use of two separate acceptance criteria: 95/5 for primary deficiencies, and 95/10 for secondary deficiencies.

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NRC Comment

2. Page 1 of the ASRR document states that the 1987 QA records survey of approximately 4500 records "verified the attributes of the QA records necessary to substantiate the quality of . . . activities . . . ." We believe the quoted words could be interpreted (wrongly) to mean that the survey revealed no problems. We understand a number of CAQs [conditions adverse to quality] resulted from this survey, and the statement should be clarified.

TVA RESPONSE

2. TVA agrees with NRC's comment and clarifies that the correct wording should be that the 1987 QA record survey "reviewed the attributes of the QA records to evaluate the quality of . . . activities . . . ."

NRC Comment

3. The discussion of the currency of records reviewed (page 4 of the ASRR) is, in general, very good. However, for cases where a CAP record exists, it should be made clear that previous records of attributes not covered by the CAP will be considered in the ASRR.

TVA Response

3. CAP records will be one of the types of records that are reviewed for elements. They will be reviewed for the specific attributes they cover. Other records will be reviewed as necessary for other attributes.

NRC Comment

4. The sample selection method described on page 5 of the ASRR document presumes 60 samples will be selected from a relatively large population. If a given population is less than 60, the ASRR document should clarify whether the sample size will equal the population size and describe the acceptance criteria.

TVA Response

4. If the record population is less than 60, TVA will perform a 100 percent review of that record type. Therefore, the acceptance criteria discussed in Item 1 does not apply. In these cases, TVA will be fully confident that all deficiencies in the population will be identified and resolved.

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NRC Comment

5. There appears to be a conflict between the "approach of reviewing current configuration" (ASRR page 4) and reviewing "all TVA records" for each selected component (ASRR page 5). This should be resolved.

TVA Response

5. The following is provided as a clarification of ASRR, page 5, paragraph C.(4). The review for current configuration relates to the use of current approved design as the basis for accepting the existing as-built condition and the associated QA records. The ASRR will sample review and evaluate all record types which represent the current configuration and status.

NRC Comment

6. The sample review process described on page 6 of the ASRR document indicates that, once a sample has been selected, the records supporting the current configuration will be retrieved. It is not clear how TVA will ensure that the records reviewed will include all CAP records.

TVA Response

6. CAP records will be reviewed together with all other records applicable to the items selected by sampling. Not all CAP records are complete and in the vault at this time, since work is still in progress on many CAPs and special programs. Where CAP records are complete and in the vault, they will be retrieved with the records they supplement, or in some cases as superseding records.

NRC Comment

7. It appears that some of the examples of secondary deficiencies listed on page 6 of the ASRR document could easily be considered to be primary deficiencies. For example, an illegible record could be no better than "Results blank." Similarly, a wrong component identifier could invalidate a record such that it is no better than a "Record missing." There should be a means described to recognize and evaluate such deficiencies.

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TVA Response

7. TVA agrees with NRC's comment and has developed additional clarification for use in applying the deficiency categories, Primary and Secondary. TVA recognizes that there can be extreme cases of secondary deficiencies which have the same adverse affects as primary deficiencies. Because of this, the implementing procedures for the ASRR provide direction to assure that the ASRR Record Assessment Team supervisor evaluates deficiencies that adversely affect important data or information on the record necessary to substantiate the quality of work or material to determine if they are primary deficiencies.

NRC Comment

8. Section 3 of the ASRR document differentiates between primary and secondary hardware deficiencies on the basis of their design significance. Consistent with this, page 1 of Figure 3 of the ASRR document uses safety significance of records and design significance of hardware. The term "design significance" needs to be defined and its relationship to safety and "safety significance" should be clarified.

TVA Response

8. The following are definitions applied to the terms "design significant" and "safety significant."

Design Significant Deficiency - A condition found to be in nonconformance with the appropriate code, standard, or licensing requirements.

Safety Significant Deficiency - A condition which, if it remained undetected, could result in the loss of capability of the affected system or structure to perform its intended safety function.

These definitions were previously used to classify discrepancies that resulted from the Vertical Slice Review performed in 1988 as part of the systematic evaluation of WBN.

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NRC Comment

9. As discussed in l.c. above, we believe the hardware acceptance criteria of 10% for secondary deficiencies (page 9 of the ASRR document) should be for the combination of primary plus secondary deficiencies.

TVA Response

9. TVA agrees with NRC's comment and the acceptance criteria of 10 percent for the combination of primary plus secondary deficiencies will be applied to the hardware review process.

NRC Comment

10. Most of the ASRR document speaks of "plant elements" and "record types" such that these terms are relatively clear. Page 9 of the ASRR document, under "Hardware Population Acceptance Criteria," uses the term "element type." The meaning of "element type" is unclear.

TVA Response

10. The terms "element" and "element type" as used in the ASRR document are synonymous. They refer to the categories of plant equipment, components, and structures that have similar attributes.

NRC Comment

11. The example of trend analysis at the bottom of page 10 of the ASRR document should be continued to illustrate how the "weighted average technique" will be utilized for some assumed deficiency rates.

TVA Response

11. In the TVA ASRR plan, "stratified" or "directed" sampling is used to assure that records from all element types are included in the sampling process, and therefore to gain confidence that there are no "bad spots" in the record population. The example at the bottom of page 10 of the ASRR document was aimed at showing how, from this directed sampling process, an uneven sample size distribution could result if information from previous record reviews was used. In this example, the resulting sample size was 6 in each of 9 element types and one of size 300 in a single element type as shown in column 3 of the following table.

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Example From Page 10:

(1) Plant Element Type	(2) Size of Population	(3) Sample Size From Pg. 10	(4) No. of Defects In Sample
1	700	300	1
2	100	6	3
3	70	6	0
4	40	6	0
5	20	6	0
6	20	6	0
7	20	6	0
8	10	6	0
9	10	6	0
10	10	6	0
Total	1,000	354	4

To continue this example, note that in column (2) the sizes of the record population for each element type are postulated, and in column (4) is a hypothetical example of what the sampling results might look like. Both the distribution of population size and the distribution of sample size affect the results of the weighted average technique.

To illustrate the need for the "weighted average technique," note that in this example are a total of 4 defects in a sample of size 354. If one interpreted this data as if it were the result of a pure random, nonstratified sample, one would conclude that the defect rate,  $f_A$ , for the ANSI group as a whole satisfies our 95/5 acceptance criterion. On the other hand, interpreting the data in this example using the weighted average technique gives the following results:

$$f_A = \sum_{i=1}^n \frac{N_i}{N_A} f_i$$

$$f_A = \left( \frac{700}{1000} \right) \left( \frac{1}{300} \right) + \left( \frac{100}{1000} \right) \left( \frac{3}{6} \right) + 8 \times 0 = .052$$

Therefore by using the weighted average technique, it was determined that the ANSI group does not satisfy the acceptance criterion.

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The explanation of this situation is that, based on the sample results, there is a suspected "bad spot" in the population, namely plant element type 2. In this example one would now activate the extent of condition process under which one would designate element type 2 as a suspect area and do further sampling and investigating of this area.

The remaining elements 1 and 3 through 10 would be designated the "residual population." For this population, the sample result is one defect out of 348 sampled, which would appear to easily satisfy the acceptance criterion. However, as discussed in Reference 3 of this enclosure, this sample may be rendered nonrandom by the process of excising the suspect area. (This is in addition to the original nonrandom condition resulting from the stratified sampling.) Therefore, as a matter of good (and conservative) practice, confirmatory random sampling would be done on the residual population.

In the above example, the weighted average technique showed that the ANSI record type population did not pass the acceptance criterion, whereas the use of a random, nonstratified sample interpretation would have shown that it did pass that criterion. Examples can also be constructed of the reverse situation, where the random sample interpretation shows it does not pass while the weighted average shows it does pass. Please note that both interpretations address only the issue of acceptability of the ANSI group as a whole. With respect to this issue, the weighted average technique in both cases provides the correct result for the ANSI group as a whole. Also as explained in the ASRR document and in TVA's response for NRC question 13, the TVA plan is aimed not only at assuring that the ANSI groups as a whole satisfy the acceptance criteria but also at assuring, further, that there are no "bad spots" within the ANSI groups.

NRC Comment

12. Page 1 of Figure 3 differentiates deficiencies as substantive or administrative. It is not clear whether this differentiation is the same as primary and secondary in the text.

TVA Response

12. The terms "substantive" and "administrative" used in page 1 of Figure 3 are synonymous with the terms "primary" and "secondary" used to categorize deficiencies in other parts of the text of the ASRR document.

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NRC Comment

13. Please describe the statistical sampling plan used to establish the confidence levels.

TVA Response

13. The sampling plan used for the ASRR is briefly described below. The conceptual and mathematical basis for this plan is described in References 1, 2, and more specifically in Reference 3 listed below.
- A. In developing this sampling program, TVA has, in addition to the ANSI types, stratified the records population by element type. This is reflected in the matrix of Figure 1 in the ASRR document.
  - B. TVA is "directing" the sampling in each ANSI group such that each plant element type is represented equally in the new sample. Within the element type records are selected randomly.
  - C. In evaluating the sampling results, TVA will calculate the defect fractions for the ANSI types (represented by the rows in the matrix) and will also look at how the sample results fall out by element type (represented by the columns in the matrix).
  - D. In adopting the plan described in Items A, B, and C above, TVA is meeting the acceptance criteria with respect to the ANSI groups, and, in addition, assuring that no "bad spots" exist in the population. For this purpose, TVA will use the extent of condition process and the stratification by element sub-populations.
  - E. Since, within each ANSI group, the sampling is "directed" rather than random with respect to the plant elements, the sample results cannot be treated using random mathematics. The weighted average technique mentioned in Reference 3 will be used. This is discussed more fully in the answer to NRC question 11.
  - F. The criterion for acceptability of an ANSI type is based on the defect fraction for that type, e.g., 95/5. It is not based on a sampling plan statement such as "1 or less defects out of a sample size of 60." Such a statement should be regarded only as a translation of the more basic 95/5 type criterion. This translation is valid only for a random sample. It is not valid for a directed sample. Thus, in the case of the directed sample, the basic 95/5 type criterion for the defect fraction of the ANSI group as a whole must be used and the defect fraction must be calculated using the weighted average technique.

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References:

1. Winkler and Hayes, Statistics: Probability, Inference and Decision, Holt, Rinehart, Winham, 1975.
2. Kaplan, S., "Bayesian Sampling for Quality Confidence-I," Pickard, Lowe and Garrick, Inc., prepared for Tennessee Valley Authority, PLG-0760, Revision 2, February 1990.
3. Kaplan, S., "Bayesian Sampling for Quality Confidence-II," Pickard, Lowe and Garrick, Inc., prepared for Tennessee Valley Authority, PLG-0806, Revision 1, March 1991.