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Mr. Uldis Potapovs, Chief
Vendor Inspection Branch
U.S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Region IV
611 Ryan Plaza Drive, Suite 1000
Arlington, Texas 76011

- REFERENCES: (1) Letter; D. E. Guilbert to Uldis Potapovs, May 1, 1980.
(2) Letter; J. H. MacMillan to Uldis Potapovs, February 26, 1980.

Dear Mr. Potapovs:

On May 15, 1980, NPGD completed an audit of calculation packages as committed in our Reference (1) letter. This audit was based on the instructions contained in our procedure NPG 0402-01. However, we believe the NPGD procedure contains requirements which are significantly more demanding than the requirements set forth in ANSI N45.2 and N45.2.11 as endorsed by Regulatory Guides 1.28 and 1.64. This conclusion was reached after completion of the audit and investigation conducted by NPGD and discussed further in this letter. Details regarding how the audit was conducted and the number of documents involved are contained in the audit report.

Our audit of the calculation packages indicated essentially no difference in the documentation of input source references in the packages prepared before and after extensive retraining was conducted. Investigation revealed that this occurred because the personnel involved in performing and reviewing the calculations had certain "common knowledge" input, so well known, that regardless of the retraining, they continued to make the judgment that there was no need to document it in the package. The theory of "common knowledge" was tested and the results of the investigation indicate that a NPGD trained, technically qualified individual who is familiar with the NPGD Nuclear Steam System design can review, understand, and verify the results of the NPGD calculations without recourse to the originator.

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Mr. Uldis Potapovs
Mr. D. E. Guilbert

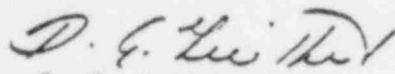
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These personnel, through their training, experience, and familiarity with the design, have indeed acquired certain "common knowledge" well known by those involved with calculations in a specific discipline. After careful evaluation of the results of our audit and investigation, it is our conclusion that the calculation packages are technically sound, contain adequate information to permit verification, and thereby meet the requirements of the ANSI standards. Although we recognize that this is a change in position from our original response, we believe the results of our investigation supports this position and that the attached report will provide you with the information necessary for you to come to the same conclusion.

In addition, we do not believe our results and conclusions to be in disagreement with those of the NRC inspector per se, but believe the additional information provides adequate justification of why the input sources found to be lacking in the present calculation packages are not required. Based on the foregoing discussion, it is NPGD's opinion that no further action is required on the existing calculation packages. To avoid any further confusion or misunderstanding with regard to our calculation package requirements, our procedure covering these activities will be revised by August 1, 1980 to reflect our position.

Should you have any questions concerning this response, we will be pleased to discuss them with you.

Sincerely,



D. E. Guilbert
Vice President
Nuclear Power Generation Division

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RESULTS OF NPGD QA AUDIT OF CALCULATION PACKAGES

I. PURPOSE

This audit was conducted in response to the NRC request for additional information concerning the NPGD response to Deviation A of NRC Inspection 79-04. The purpose of the audit was to determine if the calculation package discrepancies cited in Deviation A were widespread.

II. Audit Scope/Method

The packages audited were divided into two samples. The first sample characterized calculations released prior to September, 1979 and the second sample characterized those calculations released after September, 1979. The purpose of separating the samples was to determine if there were any differences in implementation of procedural requirements following the re-training of all NPGD engineers during September, 1979. The re-training in the NPGD administrative procedure requirements for calculation packages was conducted as a result of NPGD Internal Audits #6 and #70.

The population size for calculations released prior to September, 1979 was determined to be 7220 and the population size for those released after September, 1979 was determined to be 500. Based upon methods of statistical inference, a random sample size of greater than twenty is sufficient to characterize large populations (i.e. greater than 100). If no errors were found, a sample size of greater than twenty would yield a 95% confidence level that the error rate in the total population was less than 5%. If errors were found, then the precision of the sample error rate when projected for the total population would depend upon the magnitude of the sample error rate (i.e. the larger the sample error rate the greater its precision). The foregoing criteria was derived from Elements of Statistical Inference, 4th Edition, by Huntsberger and Billingsley and the B&W Sampling Manual for Auditors.

Based on the above minimum sample size criteria of twenty, twenty-three packages were randomly selected from those released prior to September, 1979 and twenty-one packages were randomly selected from those released after September, 1979 to yield a total sample size of forty-four. The vast majority of engineering disciplines responsible for producing calculations were represented in both of the samples.

III. Audit Criteria

The calculation packages were audited against the requirements of NPGD Administrative Procedure NPG-0402-01 (Rev 7 dated 10-20-78), "Preparation and Processing of NPGD Calculations". This was the procedure that was in effect during the December, 1979, NRC inspection of NPGD.

IV. Audit Results

This audit revealed that there was no discernible difference between those packages released before or after September, 1979. The major perceived administrative error found by the auditors was the lack of consistently referencing the sources for all design inputs used (i.e. twenty-one of the forty-four packages audited had this type of error). The fact that the NPGD re-training effort had no apparent effect on the referencing of sources of design input within the calculation packages was a major concern requiring further investigation. Discussions were held among the auditors and with other knowledgeable engineering personnel to determine the reason for finding essentially no improvement in the calculation packages. These discussions revealed wide differences of opinion as to when failure to reference the source of a design input was, in fact, a deviation from the NPG-0402-01 requirements. Depending upon their background and experience, the cognizant NPGD personnel felt that certain design inputs were "common knowledge" to those preparing and reviewing the calculations and consequently the sources of input need not be referenced. For example, one auditor questioned why a package did not contain a reference for the wall thickness of a "Schedule 40" pipe; whereas, another auditor did not question this since he knew that this was a handbook value. Another example was the lack of source references for fuel cycle data used in some of the calculations audited. For a person familiar with the NPGD system, it would be "common knowledge" that fuel cycle data are obtained from the Fuel Contract Information Sheets.

At this point, it became apparent that there existed within NPGD an internal difference of opinion regarding the NPG-0402-01 requirements for identifying sources of design inputs even after the re-training sessions. This difference of opinion accounts for some packages not referencing sources of "common knowledge" design inputs while other packages did reference these sources.

In order to test the theory that sources of certain design inputs were not referenced because they were considered to be "common knowledge", the available original reviewers of the twenty-one packages in which references were not given for all input sources were interviewed. The purpose of the interviews was to determine if the package reviewers without prior notice or assistance could readily identify the sources of design inputs for which no references were given. These interviews revealed that the reviewers could quickly identify the sources of design inputs for which no references were given. It also confirmed that these personnel did not consider it necessary to identify these sources since they considered them to be "common knowledge." In several instances, the original reviewers were not available and other equally qualified persons were able to readily identify the unreferenced sources of design input. The success of the above approach in identifying sources of "common knowledge" design inputs confirms that the NPGD calculation packages meet the ANSI N45.2.11 requirement that calculations be "sufficiently detailed" as to design input and references such that a person technically qualified in the subject of the calculation can review and understand the calculation and verify its accuracy without recourse to the originator of the calculation.

ATTACHMENT I

CORRECTIVE ACTION PLAN FOR NPGD SAFETY RELATED CALCULATIONS

The Corrective Action Plan for resolving the question of not consistently identifying the sources of design inputs in calculation packages is as follows:

I. New or Revised Calculations (Released after September 15, 1980)

The NPGD Administrative Procedure NPG-0402-01 for calculations will be revised and implemented (including training and release) by September 15, 1980.

- A. Design inputs are as defined in ANSI N45.2.11 and must be from documented sources.
- B. Design inputs taken directly from Customer, Vendor or NPGD documents must be referenced to a source listing contained in the calculation package. These design input sources must be identified with their document number and revision number or applicable identifier and the identified sources must be retrievable from the NPGD Records Center or a copy of the source may be included in the calculation package.
- C. Design inputs taken directly from Codes, Standards or Regulatory Requirements must be referenced to a source listing contained in the calculation package. These sources must be identified as to their applicable issue and/or addenda.
- D. Design inputs taken directly from handbooks, textbooks, etc. that are "common knowledge" to any individual technically qualified in the subject of the calculation need not have their sources identified, (i.e., inputs such as Pi, Material Densities, Standard Temperature and Pressure, etc.).

II. Past Calculations (Released prior to September 15, 1980)

A. Past Calculations Referenced in New or Revised Calculations

Those calculations from which design inputs are used will be reviewed using the clarifications stated in I above and any necessary corrections made.

B. Past Calculations That Have Legibility Problems (As Identified In Legibility Audit)

These calculations will be reviewed using the clarifications stated in I above and any necessary corrections made. Target date for completion of this effort is September 1, 1981.

C. Past Calculations That Are Referenced In Reload Reports

These calculations will be reviewed as new reload reports are prepared. They will be reviewed using the clarifications stated in I above and any necessary corrections made.

ATTACHMENT I
CORRECTIVE ACTION PLAN FOR NPGD SAFETY RELATED CALCULATIONS

II. Past Calculations (Cont'd)

D. Past Calculations That Support FSAR's For Active NSS Contracts

Past calculations that form the basis for information contained in FSAR's for CPCO, TVA and WPPSS will be reviewed using the clarifications in I above. However, a secondary plan must be developed using the following guidelines:

1. These calculations must be identified
2. The probability of certain calculations being revised in the FSAR review process will be determined. Review of those calculations that have a high probability of revision will be deferred until the calculations with a low probability of revision are reviewed.
3. The review of these calculations will be over a 3½ year time span since this is the earliest time span presently expected for the CPCO, TVA, or WPPSS plants to go into commercial operation. If this time span is contracted, then adjustments will be made to complete the review and corrections prior to commercial operation.
4. Completion of review and corrections will be as follows:
 - Complete TVA Prior to May 1, 1983
 - Complete CPCO Prior to November 11, 1983
 - Complete WPPSS Prior to May 5, 1984

III. Training and Performance Monitoring

- A. Upon issuance of the revised calculation procedure, all engineers involved in the preparation and review of calculations will be given training relative to the identification of sources of design inputs. The Engineering Department Manager will be personally involved in conducting this training. Target date for completion of this training is September 15, 1980.
- B. After training is completed QA will monitor performance of new calculations by auditing on a monthly basis, and report the results of these audits to the Engineering Department Manager. These audits will be conducted monthly for at least a six month time span.

ATTACHMENT III

NPGD CALCULATION PACKAGE AUDIT RESULTS MATRIX

Calculation Release Date	Sample Size	Type Errors Found	Sample Error Rate	Projected Population Error Rate
Prior to September, 1979	23	Sources of Design Inputs not Consistently Identified	48%	48 ± 21%
After September, 1979	21	Same As Above	48%	48 ± 20%

NOTE: Projected Population Error Rate is at 95% Confidence Level

The following is a summary of the results of a legibility audit conducted prior to May 30 of safety-related records in the NPGD Records Center. The plan which was developed by June 6, 1980 for evaluating and/or correcting the archival records is also presented.

Records Audit

A statistical audit plan was developed to determine illegibility rates in safety-related documents filed after June 16, 1975, the date of the NPGD commitment to the records management program as specified in ANSI N45.2.9. Samples of records were chosen using random selection techniques from several categories of records, including calculations, vendor drawings, vendor documents and Charge Inquiry/Authorizations (CI/A's), Field Change Authorizations (FCA's), etc. These records were retrieved and examined using a microfiche reader. The standard of acceptance was based on the ability of the individual reviewer of the record to be able to read the information on the microfiche. Results of this audit were as follows:

Random Sample Summary

<u>Category</u>	<u>Sample Size (Documents)</u>	<u>Approximate Total Pages</u>	<u>Partially Illegible Pages</u>
Calculations	60	2480	32 (1.3%)
Vendor Drawings and Documents	150	1003	21 (2.1%)
CI/'s, FCA's, etc.	60	1116	31 (2.8%)

Based on the results of this survey, a plan for evaluating and/or correcting the illegible pages in the safety-related records was developed and is described below.

Evaluation/Correction Plan

The following table represents the approximate number of pages of safety-related records which must be examined and evaluated/corrected if found illegible. This table includes safety-related records on active contracts only (i.e., contracts which have been cancelled will not be audited; these contracts will be audited if they are reactivated or the components assigned to other safety-related nuclear applications). Only records entered into the Records Center following the commitment to the records management system will be examined.

POOR ORIGINAL

Document Review and Evaluation/Correction Program

<u>Category</u>	<u>Approx. Number of Documents</u>	<u>Approx. Number of Pages</u>
Calculations	9,700	400,900
Vendor Drawings and Documents	17,722	127,858
CI/A's, FCA's, etc.	4,338	80,470

During the review of these records, trends will be determined to allow simplification of the review process. For example, if a particular class of records, such as documents from a particular supplier, B&W-initiated drawings, or similar groups of documents, can be shown to have minimal error rates, further audits of these classes of documents will not be conducted.

During the audit process, records will be kept to identify those documents deemed illegible by the reviewer. These documents will be sent to the responsible Engineering or Purchasing personnel who will evaluate the "illegible" portions and record their evaluation or correction if necessary. These records will be part of the archival file.

Supplier data packages will not be included in this review, since the record copy of these data packages is transmitted to the licensee along with the hardware which they represent. Microfiche copies of these data packages are kept in NPGD files only for reference purposes, not to provide an official quality record. Data packages in process between receipt from the supplier and transmittal to the customer are protected in that the supplier retains copies of information transmitted to B&W, thus providing backup in the event of a catastrophic loss.

The audit and evaluation/correction process is expected to take approximately two years, with the audit portion requiring about 18 months. This will require an audit rate of approximately 1600 pages per day over the next 18 months. Target benchmarks for measuring progress on this audit are shown below.

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Approximate Intermediate Benchmarks

<u>Benchmark</u>	<u>Target Date</u>
Complete Audit of Calculations	March 1, 1981
Complete Evaluation/Correction of Illegible Calculations	Sept. 1, 1981
Complete Audit of Vendor Documents	Jan. 1, 1982
Complete Evaluation/Correction of Illegible Vendor Documents	March 1, 1982
Complete Audit of CI/A's, FCA's, etc.	July 1, 1982
Complete Evaluation/Correction of Illegible CI/A's, FCA's, etc.	Sept. 1, 1982

(Note - Order of auditing and evaluating/correcting various categories may be changed.)

Prevention of Future Illegibility Problems

Standards have been established for the review and acceptance of incoming documents into Release Administration and/or the Records Center. These standards are based on an assessment of source documents which will yield legible micro-film. In addition, copies of the standards have been located in some areas where these records are typically developed and processed.