UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

JAN 2 8 1985

Docket No. 50-423

APPLICANT: Northeast Nuclear Energy Company

FACILITY: Millstone Nuclear Power Station, Unit 3

SUBJECT: SUMMARY OF MEETING TO DISCUSS NEED FOR ADDITIONAL DESIGN VERIFICATION ACTIVITIES AT MILLSTONE 3

A meeting was held with Northeast Nuclear Energy Company on January 11, 1985 at 10:00 AM in Bethesda, Maryland. The applicant was represented by members of Northeast Utilities and Stone & Webster Engineering Corporation (SWEC). The NRC staff was represented by members of the NRR Division of Licensing and the I&E Division of Quality Assurance, Safeguards and Inspection Programs. A list of attendees is included as Enclosure 1.

The purpose of this meeting was to discuss the applicant's proposed alternatives to performing an Independent Design Verification Program (IDVP). The applicant began the meeting by referring to a letter transmitted from W. G. Counsil to Mr. D. G. Eisenhut, dated October 26, 1984. In this letter, the applicant presented a description of the various programs being used at Millstone 3 to achieve design assurance. Consequently, the applicant stated that it does not intend to conduct a separate IDVP for Millstone 3 nor does it think there is any justification for the NRC staff to conduct an IDI.

Of the various programs currently being used, the staff was most interested in the SWEC Engineering Assurance (EA) Program. The applicant gave a brief overview of the EA Program including scope of technical audits completed on Millstone 3 and significant findings. Three of four audits scheduled for Millstone 3 have been completed. The fourth audit will be conducted during the period from April to July 1985. The applicant informed the staff that the scope of this audit has not yet been determined.

Following the applicants overview Mr. Eifert, representing the Stone & Webster Engineering Assurance Division, presented details of the Engineering Assurance Technical Audit Program for Millstone 3. An outline of this information is contained in Enclosure 2.

Mr. Eifert discussed the EA Program in comparison to IDVPs/IDIs. The staff asked about the difference in manhours expended per audit for the EA program audit and indicated that the number of manhours used to perform an IDVP or IDI is about twice that for the EA audit. Stone & Webster indicated that one EA audit is not equal in scope to the IDVP/IDI but because several audits are done as part of the program, the overall scope is broader.

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A PDR

Stone & Webster also discussed different types of audits performed for 4 plants currently included in the EA program. Program audits concentrate on procedures governing an activity, document control, review and approval and completeness and clarity of documents. Technical audits concentrate on design consistency and technical adequacy. Technical audits may be either a system audit or an activities audit which concentrates on several activities within a specific discipline.

An outline of a typical audit chronology was presented showing activities associated with planning and preparation, performance, reporting and follow-up action. SWEC discussed how audit observations are presented. It was emphasized that after issuance of the audit report the utility must respond to the audit observations within a short period of time.

Before the close of the meeting the NRC staff provided some comments on the EA program. It stated that in the past programmatic audits performed have not been successful in detecting problems. However, the staff concluded that information presented during this meeting substantiated the view that the scope of the EA program is over and above that for programmatic audits. It also commented on the potential effectiveness of technical audit programs such as that being performed at South Texas.

The NRC staff stated that an ongoing management supported technical review program within the utility company, such as the EA program at Millstone 3, may be an acceptable alternative to a third party review performed at the end of the design/construction effort.

In concluding the meeting the staff stated that it would like to meet with the applicant in the near future to discuss the applicants plan for the fourth EA audit at Millstone 3. The scope and the degree to which this audit will combine different engineering disciplines should be addressed. The staff will then consider whether its concerns regarding design verification can be satisfied using the information gained from the EA program conducted for Millstone 3. Based on its conclusion the staff will determine whether it will conduct an IDI for Millstone 3.

ORIGINAL SIGNED BY:

E. L. Doolittle, Project Manager
Licensing Branch No. 1
Division of Licensing

Enclosures: As stated

cc: See next page

DISTRIBUTION:
See attached page

*See previous page for concurrences

LB#1:DL	IE:QAB	IE:QUAB	IE:QUAB	LB#1:DL
*EDoolittle:kab	*EImbro	JMilhoan	*TAnkrum	BJYoungblood
01/23/85	01/23/85	01/ /85	01/24/85	01/28/85

MILLSTONE

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ENCLOSURE 1

MEETING ATTENDEES FOR

IDVP/IDI MEETING - MILLSTONE 3

JANUARY 11, 1985

Name	Organization
E. Doolittle	NRC/NRR/DL/LB#1
E. Imbro	NRC/IE/QAB
R. Parkhill	NRC/IE/QUAB
J. G. Partlow	NRC/IE
J. L. Milhoan	NRC/IE/QUAB
J. G. Spraul	NRC/IE/QAB
T. Ankrum	NRC/IE/QUAB
W. M. Eifert	SWEC
D. O. Nordquist	Northeast Utilities
R. T. Laudenat	Northeast Utilities
S. Orefice	Northeast Utilities

ENCLOSURE 2

Millstone Unit 3
Design Verification Activities

- Introduction
- Overview October 26 Letter
- Overview Of EA Technical Audit Program
- Details Of Engineering Assurance Audit Program
- Conclusions

Overview

SWEC Engineering Assurance (EA) Technical Audit Program

Purpose:

Evaluate the control of the design process and determine the technical adequacy of design.

Areas Covered:

1) Regulatory requirements and design bases are translated into specifications, drawings, and procedures.

2) Design information correctly supplied to required contractors.

3) Design engineers have sufficient technical guidance.

4) Design change control equivalent to original design.

Scope of Audit

Verify both design consistency and technical adequacy thru both horizontal and vertical reviews.

Completed EA Technical Audits MP-3:

1) Date - 5/9/83 - 7/29/83

   Scope - Horizontal review of engineering activities and interfaces.

   Man Hours - 2000 (approximately)

   Audit Team - 13 individuals, 9 PE's, 152 years nuclear experience.

2) Date - 1/23/84 - 5/14/84

   Scope - Vertical review RHS system.

   Man Hours - 2200 (approximately)

   Audit Team - 16 individuals, 11 PE's, 219 years nuclear experience.

3) Date - 8/20/84 - 12/10/84

   Scope - Horizontal review of engineering activities and start-up.

   Man Hours - 2200 (approximately)

   Audit Team - 13 individuals, 7 PE's, 174 years nuclear experience.

Scheduled:

1) Date - 4/85 - 7/85

Scope - To be determined (horizontal and vertical)

Man Hours - 2900 (approximately)

Significant Findings:

See attached.

Conclusion:

The EA Technical Audit Program is an effective "Applicant Independent Program". This program along with other verification programs as noted in our letter of October 26, forms the basis of our position that neither an IDUP or IDI is warranted for MP-3.

EXAMPLES OF THE MORE SIGNIFICANT FINDINGS IDENTIFIED BY TECHNICAL AUDITS

FINDINGS

UNDERSIZED ELECTRICAL CABLES

- CABLE MODIFICATIONS REQUIRED
- EXTENSIVE EFFORT TO VERIFY ADEQUACY OF CABLE SIZES

INCOMPLETE WELD DETAILS *

- VENTILATION DUCTS WITH LESS THAN FULL PENETRATION WELDS

RHR HEAT EXCHANGER FOUNDATION INADEQUATE

- LATERAL SUPPORTS MISSING FROM DESIGN DRAWINGS
- REPORTABLE UNDER 55E

ERRORS ON ESKS

- CONTACT ERRORS WOULD CAUSE MIS-OPERATION OF MOVS
- OVER 30 ESKS AND REMOTE SHUTDOWN PANEL HARDWARE MODIFICATIONS

FSAR INCONSISTENT WITH ASME CODE *

- ISOLATION OF REACTOR COOLANT SYSTEM FROM RHS DOES NOT MEET CODE CRITERIA FOR OVERPRESSURIZATION PROTECTION

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* MILLSTONE UNIT 3

Details of
Engineering Assurance Technical Audit Program
Millstone Unit 3

1. IDVPs/IDIs vs. SWEC Technical Audits.
2. Attribute Categories Evaluated During Audits.
3. Typical Activities and Areas that are Required to be Audited on an Annual Basis.
4. Examples of Approaches for In-Depth Technical Audits.
5. Typical Audit Chronology.
6. In-Depth Technical Audits System Selection Considerations.
7. Generation of Action Items.
8. An Approach to Drafting an Audit Observation.
9. Schedule of EA Technical Audits thru 12/31/85.
10. SWEC EA Technical Audits Performed as of 12/31/84.
11. SWEC EA Technical Audits for Millstone Unit 3.
12. EA Program and In-Depth Technical Audits of Millstone 3 Project - Approximate Manhours (From 1981 thru 1985).
13. Examples of the More Significant Findings Identified by Technical Audits.

IDVPs/IDIs VS SWEC TECHNICAL AUDITS

The NRC feels that utilities have not adequately covered the integrated process from design to installation, including making changes as a result of the installation process. The IDVP/IDI program addresses this alleged inadequacy.

Purpose of IDVPs/IDIs

- Stated purpose of IDVPs/IDIs are to determine whether the design process used in constructing the plant has complied with NRC regulations and licensing commitments. The NRC team inspects areas defining whether (1) regulatory requirements and design bases as specified in the license application have been correctly translated and satisfied as part of specifications, drawings, and procedures, (2) correct design information has been provided internally and externally to the responsible design organizations including selected off-site subcontractors, (3) design engineers have sufficient technical guidance to perform assigned engineering functions and (4) design controls, as applied to the original design, have also been applied to design changes, including field changes.

SWEC Technical Audits

Purpose

- Purpose of SWEC technical audits are to evaluate the control of the design process and determine the technical adequacy and quality of designs for the specific nuclear power plant. In order to accomplish this, all of the above stated areas normally covered by an IDVP/IDI are covered during a SWEC technical audit.

Audit Team

- audits are led by Engineering Assurance and performed by senior engineering personnel from technical divisions.
- all of the audit team personnel are independent of any direct responsibility for performance of the activities being audited.
- more than 10 personnel normally comprise an audit team.

Manhours expended per audit

- 2000 to 2500 man hours

Duration of audit

- 3 to 4 months including preparation, performance, and reporting.

Number of Technical Audits Performed to date

- Total of 9 (4 System Audits and 5 Activities Audits)
- 3 of 9 for Millstone Unit 3 (1 System Audit and 2 Activities Audits)

Attribute Categories Evaluated During Audits

NOTE (A)

1. Procedures - Completeness of the procedures governing an activity.
2. Control - Implementation of administrative and document control requirements (e.g., indexing and filing of calculation).
3. Review and Approval - Evidence of review/approval by appropriate personnel.
4. Documentation - Completeness and clarity of a document. (e.g., Method of calculation identified, drawing references complete, design changes identified and explained).

NOTE (B)

5. Design Consistency - Agreement between document audited and the associated input and follow documents. (Major inconsistencies would be evaluated under technical adequacy).
6. Technical Adequacy - Sufficient evidence that the design will function as required. (e.g., calculation utilizes appropriate analytical method, analytical method correctly applied, pertinent inputs, design basis and parameters are considered).

NOTES

(A) A "Program" audit will concentrate mainly on attributes in categories 1 through 4.

(B) An indepth technical audit will concentrate mainly on attributes in categories 5 and 6. These audits are performed in order to more critically and thoroughly evaluate the technical aspects of the engineering process.

*TYPICAL ACTIVITIES & AREAS
THAT ARE REQUIRED TO BE
AUDITED ON AN ANNUAL BASIS

* If a particular activity is being performed at more than one location then that activity must be audited for each location. For example, if pipe support calculations were being performed by Boston, NY Office and the SEG, then each group at each location and the interface between groups would be audited since different management and supervision is involved.

PROJECT _____

J.O. NO. _____

PAGE ____ of ____

CALCULATIONS

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

SUBACTIVITY	AUDIT NUMBER-DATE			
PIPE STRESS (EMD)				
PIPE SUPPORTS (EMD)				
MECHANICAL (EMD)				
STEEL (STRUCT)				
CONCRETE (STRUCT)				
MECHANICS (STRUCT(				
FACILITIES (PWR)				
MECHANICAL (PWR)				
NUCLEAR (PWR)				
RADIATION PROTECTION				
ENGINEERING SAFEGUARDS				
PROCESS ENGINEERING				
CONTROLS				
ELECTRICAL				
HYDRAULICS				
GEOTECHNICAL				
ENVIRONMENTAL				
HEAT BALANCE				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

PROJECT _____

DRAWINGS

J.O. NO. _____

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

PAGE ____ of ____

SUBACTIVITY	AUDIT NUMBER-DATE			
PIPING				
FACILITIES				
PIPE SUPPORTS				
CONCRETE				
STEEL				
VESSELS				
ELECTRICAL				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

PROJECT _____

DIAGRAMS _____

J.O. NO. _____

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

PAGE ____ of ____

SUBACTIVITY	AUDIT NUMBER-DATE			
CABLE BLOCK DIAGRAMS				
ELEMENTARY DIAGRAMS				
FLOW DIAGRAMS				
FUNC. CONT. DIAGRAMS				
LOGIC DIAGRAMS				
LOOP DIAGRAMS				
ONE LINE DIAGRAMS				
P&IDs				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

PROJECT _____

J.O. NO. _____

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SPECIFICATIONS

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

SUBACTIVITY	AUDIT NUMBER-DATE			
CONTROLS				
ELECTRICAL				
HYDRAULIC				
ENVIRONMENTAL				
STRUCTURAL				
POWER				
ENGINEERING MECHANICS				
NUCLEAR TECHNOLOGY				
GEOTECHNICAL				
MATERIALS				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

PROJECT _____

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SYSTEM DESCRIPTION/DESIGN CRITERIA

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

SUBACTIVITY	AUDIT NUMBER-DATE			
ELECTRICAL DESIGN CRITERIA				
STRUCTURAL DESIGN CRITERIA				
CONTROL SYSTEM DESCRIPTION				
FLUID SYSTEM DESCRIPTION				
~~ELECTRICAL SYSTEM DESCRIPTION~~				
BLDG. STRUCTURAL DESCRIPTION				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

PROJECT _____

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LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

ACTIVITY	AUDIT NUMBER-DATE			
PROCUREMENT				
NSSS INTERFACE				
PROCESS PROCEDURES				
QA RECORDS				
TRAINING				
SECURITY				
TEST PROGRAM				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

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SUPPLIER INTERFACE

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

SUBACTIVITY	AUDIT NUMBER-DATE			
DRAWINGS				
DOCUMENTS				
STRUCTURAL SHOP DETAILS				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

PROJECT _____

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LICENSING PROCESS

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

SUBACTIVITY	AUDIT NUMBER-DATE			
LICENSING COMMITMENTS				
SAFETY ANALYSIS REPORT				
ENVIRONMENTAL REPORT				
PROJECT POSITIONS (RGPs & BTPPs)				
FIRE PROTECTION PROGRAM EVALUATION REPORT				
PHYSICAL SECURITY PLAN				
EMERGENCY PLAN				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

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CONTROL OF MANUALS

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

SUBACTIVITY	AUDIT NUMBER-DATE			
JOB BOOKS				
MANUALS				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

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CHANGE CONTROL

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

SUBACTIVITY	AUDIT NUMBER-DATE			
N&Ds				
E&DCRs				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

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FEEDBACK SYSTEM

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

SUBACTIVITY	AUDIT NUMBER-DATE			
PROBLEM REPORTS				
10CFR50.55(e)				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

PROJECT _____

STUDIES/SYSTEMS/ REPORTS

(DENOTE ACTIVITIES REVIEWED ON THE APPROPRIATE SHEET)

J.O. NO. _____

LEGEND: S = SATISFACTORY
X = UNSATISFACTORY
0 = INSUFFICIENT ACTIVITY TO WARRANT AUDIT

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SUBACTIVITY	AUDIT NUMBER-DATE			
OVERPRESSURE PROTECTION REPORTS				
STRESS REPORTS				

ELEMENTS:

1. PROCEDURES
2. CONTROL
3. REVIEW/APPROVAL
4. DOCUMENTATION
5. DESIGN CONSISTENCY
6. TECHNICAL ADEQUACY

For NOTES, see the reverse side.

Examples of Approaches for In-Depth Technical Audits: NOTE (A)

1. System Audit - Evaluate the design of a system (e.g., fluid system, building) by auditing the documents representing the design of the system. This would involve evaluation of design criteria and implementation thereof and the interfaces between disciplines.

2. Activities Audit - Evaluate several activities within specific discipline associated with various design aspects. (e.g., Base plate Design, small bore pipe support design, Failure modes and Effects Analysis).

NOTE

(A) The specific approach to and scope of a particular audit will depend on project's status and inputs from the project, engineering divisions, the client, and results of prior audits.

TYPICAL AUDIT CHRONOLOGY

AUDIT PLANNING AND PREPARATION	WEEK
o Obtain planning and scoping documents, (e.g., design document schedules, system turnover schedules, change document sorts)	1-3
o Obtain input from Project, Division, Client, etc. regarding system/activities and special concerns for evaluation.	1-3
o Prepare draft audit plan describing the overall purpose objectives and scope of the audit.	1-3
o Establish audit team (e.g., Technical Specialists).	1-3
o Issue Audit schedule.	1-3
o Indoctrinate auditors.	1-3
o Modify audit plan to reflect audit team input.	1-3
o Modify/prepare review plans.	1-3
o Obtain samples of documents for review when practical (e.g., diagrams, specifications, drawings, change documents).	1-3
o Establish logistics for performing audit, (e.g., work areas, project contacts, support facilities).	1-3
Audit Performance	
o Evaluate documents/interview personnel/perform field observation.	4-5
o Identify unresolved questions and concerns (Action Items).	4-5
o Evaluate responses to Action Items.	4-5
o Complete documentation in review plans.	4-5
o Hold Audit Status Meeting with Project.	4-5
Audit Reporting	
o Draft audit report sections/Audit Observations (AOs).	6-7
o Submit draft report sections/AOs to applicable Division Chiefs.	6-7
o Submit draft report to Project/Client for comment.	8
o Hold Post Audit Conference with Project/Client.	9
o Finalize report and issue.	10-12

Follow-up Action

Audit Observation responses are evaluated for identification of cause, extent of conditions, and corrective and preventive actions. These actions are verified in subsequent follow-ups.

IN-DEPTH TECHNICAL AUDITS
SYSTEM SELECTION CONSIDERATION

The following items are considered when selecting a system for audit. The ultimate selection need not include all considerations.

- o performs safety related functions
- o extensive SWEC design responsibilities, yet includes NSSS interface
- o contains multi-discipline inputs and includes various types of components and component procurement organizations, thereby, being representative of other systems
- o status of design/construction completion, e.g., in as-built reconciliation phase
- o inputs from audit organizations or client regarding previously identified concerns on other projects.

GENERATION OF ACTION ITEMS

An Action Item can be generated to identify deficiencies and/or request information. It is difficult to define precise criteria to apply in determining if an Action Item should be generated. Three considerations are: significance of individual discrepancies, number of discrepancies, and the urgency of needed information by the evaluation team member.

An Action item is to be written when one or more of the following needs exist:

1. Need to identify a technical concern.

2. Need to identify a potential technical concern and there is no information readily available to substantiate or alleviate the concern.

3. Need to identify a significant program aspect or practice that is, or appears to be, incorrect or inadequate.

4. When it is deemed necessary for the project to investigate to determine cause and extent of discrepancies.

5. When it is deemed appropriate to evaluate the Project's proposed actions to correct discrepancies and prevent recurrence.

It is generally not necessary to generate an Action Item if a minor discrepancy is observed and the discrepancy appears to be isolated/random. (However, discrepancy must be corrected during the evaluation or the document marked for future correction at next revision). Several minor discrepancies, however, would generate an Action Item.

NOTE: Review Plans must indicate all discrepancies observed regardless of significance/number and even if an Action Item was not generated. The Evaluation Team Leader will make the final decision for when an Action Item is written. His decision will be based on the above written guidance, as well as, objectivity and fairness to the issue in question at that time.

AN APPROACH TO DRAFTING AN AUDIT OBSERVATION

INTRODUCTION

The main purpose of the audit program is to resolve "systematic" or "generic" problems (i.e., obtain adequate preventive action). This requires audit reports, audit observations, etc. to be written in a manner such that overall assessments are presented; problems and their root causes can be addressed by appropriate management.

In order to maintain credibility and impact, AOs must be valid and demonstrate good judgement. It is difficult to define precise criteria to apply in determining if an AO is necessary or warranted. However, two main considerations are significance of individual deficiencies and number of deficiencies. (Does it appear that corrective action needs to be absolutely tracked and/or is preventive action necessary?)

General Examples:

1. If a minor deficiency is observed in a document and was not observed in other documents of that type - An AO is probably not warranted. (Apparently, random/isolated). (Deficiency could be corrected during audit or marked for future correction at next revision).

2. If a large number of minor deficiencies are observed in several documents - an AO is probably warranted.

3. A single deficiency of relative significance if observed in only one document may warrant an AO, even if apparently isolated, in order to assure the deficiency is corrected. (Action to prevent recurrence may not be necessary, however, if deficiency is of isolated nature).

Specific Examples:

1. Logic Diagrams and Logic Descriptions are audited. They are found to be clear, complete, consistent with FSKs, ESKs, and technically adequate. Some of the Logic Descriptions contain a few minor "typos". Should on AO written? Probably not.

2. Several Power calculations are audited. Calculations are clear and complete, appropriate methods are used, are technically adequate. In one calculation, an input value was incorrect, apparently due to a transposition error. Results would not be affected. Another calculation was not marked with the QA Category (but was Independently reviewed). Should an AO be written? Probably not.

3. Structural Calculations are audited. Calculations are found to be adequate except that in one calculation an input value is incorrect. The results are not affected. The reasons for the incorrect value appears to result from failure of another discipline to provide revised information. Time did not permit further investigation. Should an AO be written? Probably.

NOTE: Review Plans must indicate all deficiencies observed regardless of significance/number. For any deficiency not included in an AO, it must be evident why an AO was not written (e.g., minor/isolated/corrected during audit).

If we decide that an AO is probably warranted, we now have to prepare it.

AUDIT OBSERVATION PREPARATION

An Audit Observation is usually presented in two basic parts: the "Description of Condition(s)" and the "Details". In nearly all cases, it is the "Description of Condition(s)" we want addressed by audited organizations in their response to the audit observation. Therefore, audit results must be evaluated, logically grouped, re-evaluated, and a conclusion or summary presented. The details or supporting evidence then follows.

Preparation of an audit observation is more of a thought process than a mechanical exercise. The following is an attempt to describe that process.

1. LIST ALL THE DEFICIENCIES

2. Determine if there is a commonality among some or all of the items listed. Can the items be logically grouped/categorized?

   Possible Groupings/Categories:

   - By element (Procedures, control, review/approval, documentation, design consistency, technical adequacy).
   - "Probable Cause". For example: Lack of thorough review, misunderstanding of requirements, etc.
   - Consequence. For example: Various distribution problems could result in personnel working with out-of-date information.
   - Other

3. Prepare a Rough Draft AO (handwritten) using the attached outline.

4. Read the draft as objectively as possible. Is it logical? Can an overall conclusion be reached? Should this conclusion be stated in the Description of Condition(s)? Is the english, spelling, etc., correct?

AUDIT OBSERVATION OUTLINE

I. Description of Condition(s) Categories need not necessarily be presented in order shown below. In fact, it would be unusual for an AO to contain all categories.

A. Describe the basic failure of the system/activity if possible/applicable or describe the overall conclusion (e.g., "the E&DCR system does not provide complete control of design changes").

B. Summarize the deficient elements (or sub-elements). Since most people won't be familiar with element definitions, include a brief definition or examples, e.g., "... calculations are incompletely documented (methods and sources of input not identified, ... etc.)".

C. When there is strong supporting evidence, state what the observed deficiencies indicate. That is, what is the "probable cause". Sometimes the cause is implied and need not be stated.

Example: "... the improper application of the analysis method indicates a lack of guidance to the preparer ...".

D. Indicate the consequences of the deficiencies. (As stated above, this may be implied or obvious and need not necessarily be stated. Improper application of method could, obviously, affect technical adequacy).

Example: "Failure to distribute results of revised calculations could lead to ...".

E. The auditor may (in some cases) provide guidance on the boundaries for determination of the extent of conditions.

F. If any audit findings are recurrences of earlier findings on the activity being audited, this fact should be emphasized in the AO.

II. Details (Supporting Evidence)

A. Details should be grouped and sequenced to be consistent with the Summary where practicable.

B. Some type of quantitative comparison should be provided where appropriate (e.g., fifteen of the twenty selected from the list were not included in ...").

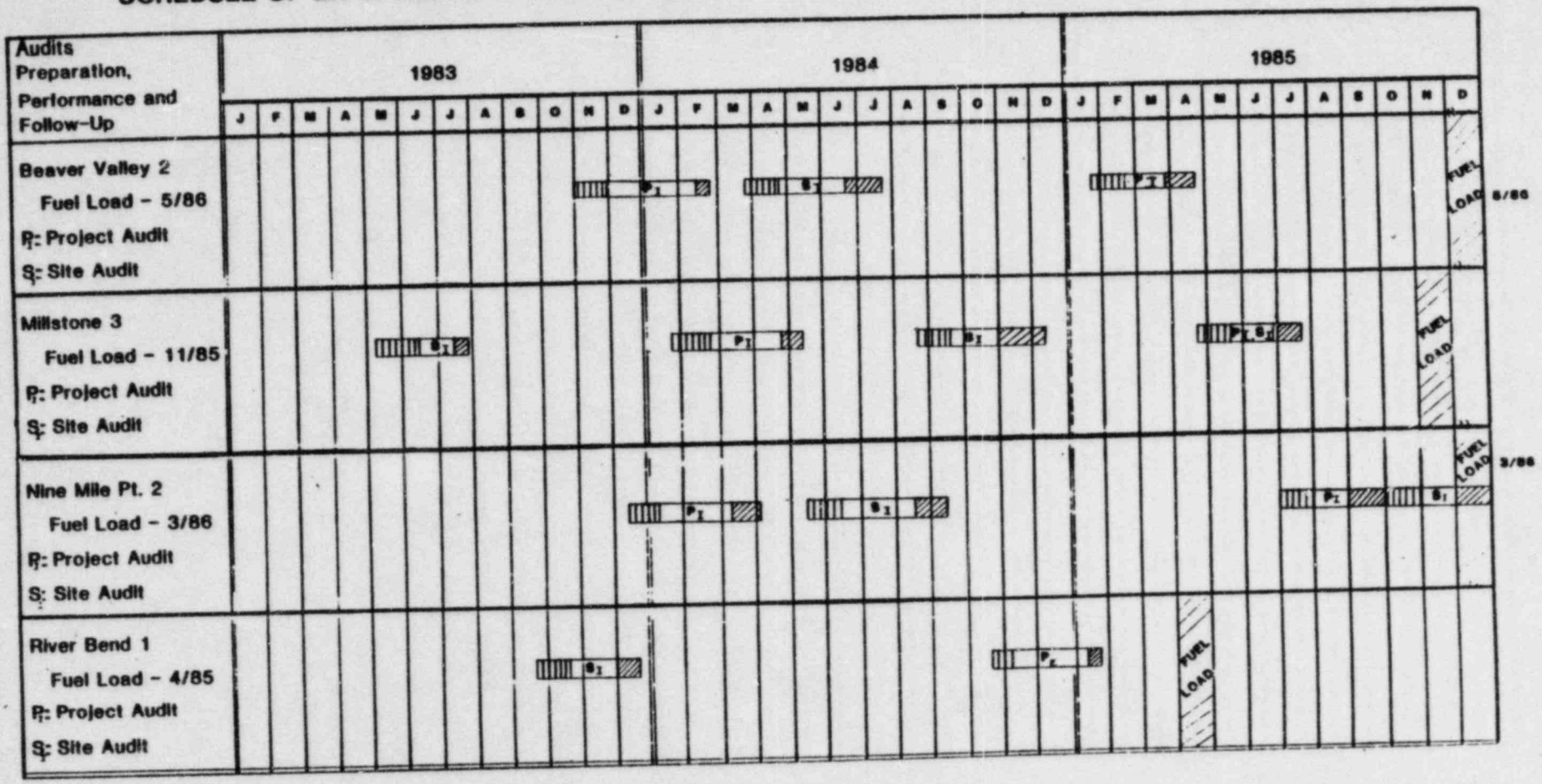
C. Provide detail, explanation, background, etc. Don't force people to "read between the lines". Take care to provide information - not just more words.

Avoid Terms Such As:

- in accordance with procedures ...
- as required by ...
- inadequate
- generally
- satisfactory

Avoid including nits.
Avoid long, complicated sentences.

SCHEDULE OF EA IN-DEPTH TECHNICAL AUDITS - MAJOR NUCLEAR PROJECTS THRU 12/31/85



Legend:

- P_1: In-Depth Technical System Audit
- S_1: In-Depth Technical Activities Audit
- P_2: Project, In-Depth Technical Evaluation (Resulting from ID1)
- - Planning
- - Performing
- - Reporting

SWEC ENGINEERING ASSURANCE
TECHNICAL AUDITS AS OF 12/31/84

Project	Type of Audit	Preparation Start Date	Audit Performance Dates	Report Issue Date
Millstone Unit 3	Activities Audit	5/9/83	6/13/83 - 7/13/83	7/29/83
River Bend Unit 1	Activities Audit	9/19/83	10/17/83 - 12/1/83	12/19/83
Beaver Valley Unit 2	System Audit	10/31/83	11/28/83 - 2/13/84	2/21/84
Nine Mile Pt. 2	System Audit	12/12/83	1/9/84 - 3/8/84	4/3/84
Millstone Unit 3	System Audit	1/23/84	2/21/84 - 4/25/84	5/14/84
Beaver Valley Unit 2	Activities Audit	3/26/84	4/23/84 - 6/20/84	7/20/84
Nine Mile Pt. 2	Activities Audit	5/14/84	6/11/84 - 8/16/84	9/14/84
Millstone Unit 3	Activities Audit	8/20/84	9/17/84 - 10/31/84	12/10/84
* River Bend Unit 1	System Audit	10/17/84	Estimated 11/5/84 - 1/11/85	Estimated 1/21/85

* Technical evaluation as a result of River Bend IDI.

SWEC ENGINEERING ASSURANCE TECHNICAL AUDITS FOR MILLSTONE UNIT 3

Completed Audits

Dates	Approx. Man-Hours	Audit Subject	Personnel Used	Titles/ Credentials
5/9/83 - 7/29/83	2000	Engineering Activities at the Site including electrical; instrumentation and controls; materials; structural; Engineering Mechanics; Power; and SEG/ FQC/Construction Interfaces	o MPBerardi	Ass't Div. Chief/PE, MSME, 12N
			o REFoley	Ass't Div. Chief/PE, BS, 13N
			o GLHarper	Supervisor, Operating Nuc. Plants/PE, AA, 15N
			o RFJones	Instrument & Controls Engineer/10N
			o JWKelly	QA Program Administrator/BS, 20N
			o RAKohl	Sr. Structural Eng./PE, MSCE, 11N
			o DLMalone	Supervisor, Internal EA Auditing/CQE,BS,17N
			o GPMoccia	Engineering Assurance Engineer/PE,BSCE,2N
			o PSullivan	Engineering Assurance Engineer/PE,BSCE,1N
			o KMMoriarty	Engineering Mechanics Engineer/BA, 9N
			o RMMcMellon	Sr. Power Engineer/PE, BSCHE, 16N
			o CGPebler	Sr. Electrical Engineer/PE, BSEE, 10N
			o RWSexton	Sr. Mechanical Engineer/PE, MS, 12N
1/23/84-5/14/84	2000	Residual Heat Removal System Audit	o SNBajpai	Nuclear Tech. Engineer/PE, MSCHE, 3N
			o MPBerardi	Ass't Div. Chief/PE, MSME, 13N
			o GBushnell	Eng'g Mechanics Supervisor/PE, BSME, 16N
			o RCauldwell	Eng'g Mechanics Engineer/BSIT, 8N
			o FFChin	Sr. Structural Engineer/PE, MSCE, 22N
			o AEHechemy	Sr. Power Engineer/PE, MSME, 15N
			o WTHotchkiss	Supervisor Safety Eng'g/PE, BSEE, 26N
			o AJHsi	Eng'g Mechanics Consultant/PE, PHD, 16N
			o DLMalone	Supervisor, Internal EA Auditing/CQE,BS,18N
			o HWMooncai	Sr. Electrical Engineer/PE, MSEE, 11N
			o KMoriarty	Eng'g Mechanics Engineer/BA, 10N
			o EPukk	Supervisor Control Systems/PE, BSEE, 14N
			o LRaghavan	Eng'g Mechanics Engineer/PE,MS,MBA, 15N
			o CDRobben	Sr. Power Engineer/PE, BS, 16N
			o PSSekerak	Eng'g Mechanics Supervisor/BET, 14N
			o PSullivan	Eng'g Assurance Engineer/PE, BSCE, 2N

SWEC ENGINEERING ASSURANCE
TECHNICAL AUDITS FOR
MILLSTONE UNIT 3

Completed Audits

Dates	Approx. Man-Hours	Audit Subject	Personnel Used	Titles/ Credentials
8/20/84-12/10/84	2000	Engineering Activities at the Site including Control Systems; Electrical; Engineering Mechanics; Materials; Power; Structural; and Start-up Test Liaison Engineering Group Work.	o PGNurnberger	NUSCO QA Engineer/BSNE, 9N
			o MPBerardi	Ass't Div. Chief/PE, MSME, 13N
			o FFChin	Sr. Structural Engineer/PE, MSCE, 22N
			o PJDesena	Sr. Power Engineer/PE, ASME, 10N
			o RGDrummond	EA Engineer/23N
			o DGGusso	Eng'g Mechanics Engineer/EIT, BSAE, 10N
			o JFHarkins	Sr. Controls Engineer/PE, BSIT, 12N
			o HWMooncai	Sr. Electrical Engineer/PE, MSEE, 11N
			o PRPepi	Eng'g Mechanics Engineer/EIT, ASME, 14N
			o AWRychalsky	Supervisor Advisory Operations/EIT,BSEE,9N
			o RBSmith	QA Auditing Section Manager/PE, 21N
			o GPMoccia	EA Engineer/PE, BSCE, 3N
			o RWTwigg	EA Lead Engineer/BSME, 17N

SWEC ENGINEERING ASSURANCE
TECHNICAL AUDITS FOR
MILLSTONE UNIT 3

Future Audit

Dates	Approx. Man-Hours	Audit Subject	Personnel Used	Titles/ Credentials
4/22/85-7/22/85	2500	One System will be audited. The purpose of this audit will be to evaluate implementation of the design process by reviewing the design of a selected system and associated systems/ structures. It will audit the documents representing the design by evaluating the design criteria and implementation thereof and the interfaces between disciplines. Selective site activities relating to the system chosen for the audit will also be reviewed. This will include such areas as stress reconciliation, environmental qualification of electrical equipment, and other areas that may be considered important by engineering divisions, the client, the project, and results of prior audits.	(Later)	(Later)

EA PROGRAM AND IN-DEPTH TECHNICAL AUDITS OF THE MILLSTONE 3 PROJECT - APPROXIMATE MANHOURS (FROM 1981 THRU 1985)

1981	PROGRAM AUDITS	2900 MHS
	TECHNICAL AUDITS	N/A
1982	PROGRAM AUDITS	2900 MHS
	TECHNICAL AUDITS	N/A
1983	PROGRAM AUDITS	3000 MHS
	TECHNICAL AUDITS (No. 1)	2000 MHS
1984	PROGRAM AUDITS	4350 MHS
	TECHNICAL AUDITS (Nos. 2&3)	4400 MHS
1985	PROGRAM AUDITS	4300 MHS.
	TECHNICAL AUDITS (No. 4)	2900 MHS.

EXAMPLES OF THE MORE SIGNIFICANT FINDINGS IDENTIFIED BY TECHNICAL AUDITS

FINDINGS

UNDERSIZED ELECTRICAL CABLES

- CABLE MODIFICATIONS REQUIRED
- EXTENSIVE EFFORT TO VERIFY ADEQUACY OF CABLE SIZES

INCOMPLETE WELD DETAILS *

- VENTILATION DUCTS WITH LESS THAN FULL PENETRATION WELDS

RHR HEAT EXCHANGER FOUNDATION INADEQUATE

- LATERAL SUPPORTS MISSING FROM DESIGN DRAWINGS
- REPORTABLE UNDER 55E

ERRORS ON ESKs

- CONTACT ERRORS WOULD CAUSE MIS-OPERATION OF MOVs
- OVER 30 ESKs AND REMOTE SHUTDOWN PANEL HARDWARE MODIFICATIONS

FSAR INCONSISTENT WITH ASME CODE *

- ISOLATION OF REACTOR COOLANT SYSTEM FROM RHS DOES NOT MEET CODE CRITERIA FOR OVERPRESSURIZATION PROTECTION

* MILLSTONE UNIT 3

Meeting Summary Distribution

JAN 2 8 1985

Docket File
NRC PDR
Local PDR
PRC System
NSIC
LB #1 Reading File
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M. Rushbrook
R. Hartfield*
OPA*

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J. G. Partlow
J. L. Milhoan
J. G. Spraul
T. Ankrum

OTHERS

bcc: Applicant & Service List

*Caseload Forecast Panel Visits