CONNECTICUT YANKEE

PLANT DESIGN CHANGE TASK GROUP

MILESTONE REPORT

REVIEW OF THE DESIGN CHANGE PROCESS

SUBMITTED BY

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EXECUTIVE SUMMARY

On December 13, 1984, the NRC issued an Order Modifying License to CYAPCo to require, 1) a review of plant design changes since January 1, 1979, and; 2) an evaluation of the plant design change process and recommendations for improvement. The Connecticut Yankee Plant Design Change Task Group (CYPDCTG) was chartered to perform this review. This report addresses the CYPDCTG's efforts on the second part of the Order.

To evaluate the CYAPCo design change process, the CYPDCTG identified potential process deficiencies during the course of design change screening and safety reviews, from a structured review of the process for selected design changes, and by review of specific documents. In accordance with CYPDCTG procedures, these deficiencies received individual and group review for their resolution.

After resolving over 100 identified deficiencies the CYPDCTG concludes that the existing procedural controls over the design change process are effective. Few deficiencies that occurred in past design changes have not been addressed in the current design change procedures. For those such deficiencies, the CYPDCTG recommends that procedures be corrected to avoid repetition of certain process problems.

However, the CYPDCTG recommends significant improvements to the overall CYAPCo design change process. These improvements generally result from the CYPDCTG'S overview of the design change process, rather than from an attempt to correct specific problems identified in past plant modifications. The major recommendations are in the areas of:

1. Control of design basis information.
2. Training of engineers on the design change process.
3. The definition of "plant design change".
4. The documentation of activities that may not be controlled under Plant Design Change Requests (PDCRs).
5. The need for a more integrated review process.
6. Specific procedure improvements for clarity and consistency.

Table 1 of this report provides a summary listing of process-related recommendations of the CYPDCTG.

I. INTRODUCTION

This report presents the findings and recommendations of the Connecticut Yankee Plant Design Change Task Group (CYPDCTG) from its review of the process used to accomplish design changes at Connecticut Yankee. This report is the third and last milestone report, following reports on the CYPDCTG screening review and detailed evaluations of PDCRs.

As specified in the NRC Order Modifying License of December 13, 1984, the CYPDCTG reviewed design changes approved since January 1, 1979 through the selected date of December 31, 1984. The review of the numerous design changes provided insight into the design change process utilized for Connecticut Yankee. This opportunity was used to provide the basis for recommendations to improve the design change process in accordance with the NRC Order.

II. METHOD

The CYPDCTG performed this review in accordance with CYPDCTG Procedure 1.04, "Review of the Plant Design Change Process", which is included in this report as Attachment 1. The effectiveness of this review depended heavily upon the CYPDCTG members' insight into the design change process, recognition of potential deficiencies, and follow through.

During the entire tenure of the CYPDCTG, members identified concerns or deficiencies in the design change process for follow-up. There were generally three opportunities to identify such items:

1. During detailed evaluations of PDCRs. This phase required members to identify project deficiencies and any causative process deficiencies. Process deficiencies that did not result in project problems were also identified. A specific form (Figure 7.1 of Procedure 1.04) was used to evaluate deficiencies and to facilitate group dispositions.

2. By a structured review of the design change process. This structured review of selected design changes sought to assess the effectiveness of seven steps in the design change implementation process: 1) engineering 2) design 3) construction 4) inspection 5) preoperational testing 6) turnover and 7) training. The effectiveness of interfaces between aspects was also evaluated. Again, specific forms (Figure 7.1 or 7.2 of Procedure 1.04) were employed when deficiencies were identified in the summaries of these reviews.

   For this review, the CYPDCTG recognized that the PDCRs selected for detailed evaluations did not provide an optimum sample for an assessment of the design change process. Those PDCRs very often were selected to review a specific technical shortcoming. Many were of limited scope and/or performed under obsolete procedures, making them unlikely projects for a review to reveal improvements in the process. Therefore, the CYPDCTG performed a structured review of a broader sample. A matrix was developed (see Attachment 2) to produce the sample used. The collective judgment of the CYPDCTG was applied to this matrix to include projects with meaningful distributions of origin, age, and technical discipline.

3. Upon recognition at any time. When a concern was identified by an individual or in group discussion, a specific form (Figure 7.2 of Procedure 1.04) was completed and entered in the file for later evaluation and group disposition. This method was most effective during the screening review, when all PDCRs were investigated. Additionally, it provided a means to document process concerns that resulted from interaction with the contracted consultant in Work Permits/Orders.

In accordance with Procedure 1.04, all deficiencies identified by these approaches were reviewed and dispositions specified. All determinations received independent reviews and subsequent concurrence of all CYPDCTG members, through signature at group meetings. Deficiencies were further evaluated to identify areas of significant weakness in the process.

The CYPDCTG also reviewed other available documents to identify additional process improvements. These documents included design change procedures from two other utilities and References 1 and 2. The External Review Group also identified areas of improvement. When deficiencies or improvements were noted, the appropriate forms were initiated for further consideration.

The CYPDCTG was not chartered to assess the thoroughness of design change documentation from a QA standpoint. At times, however, a lack of documentation meant that little evidence was available to assess the performance of a specific aspect. In this case, discussions with key individuals in the process provided input. In some cases, the effectiveness of an aspect could be deduced. For instance, when hard-copy evidence of a turnover package was lacking but the operations, maintenance and training groups had sufficient information, it was concluded that a turnover process had occurred.

The CYPDCTG was also not chartered to assess the adequacy of setpoint changes since setpoint changes are not design changes. Setpoints are specified in calibration procedures and in some cases in Technical Specifications. The current procedures provide for the appropriate evaluation of procedure and Technical Specification changes.

III. RESULTS AND SPECIFIC RECOMMENDATIONS

III-1 Introduction

The CYPDCTG identified deficiencies in the design change process at Connecticut Yankee and then developed a disposition for each deficiency. The results of this effort are addressed in two aspects:

1. Process Corrections. When deficiencies in a specific design change resulted from a shortcoming in the existing process, a process correction is warranted.

2. Process Improvement. These recommendations may not be the result of specific deficiencies or failures in the implementation of a design change. Typically, they result from a recognized weakness in a particular phase of the process or the recognition of a more effective method.

To assist follow-on actions, a summary listing of process-related recommendations is presented in Table 1.

III-2 Process Corrections

Discussion

To assess the effectiveness of the current design change process, the CYPDCTG evaluated 56 deficiencies that were identified on specific PDCR evaluations. This review assessed the adequacy of the current CYAPCo plant design change procedures in light of past failures. The basic question asked here was "Would adherence to the current procedures prevent a recurrence of this deficiency?" Where the answer was negative, a process correction was warranted.

The CYPDCTG debated the wisdom of modifying procedures for each deficiency in an attempt to prevent recurrence. While a procedure change could address each specific instance of deficiency, this approach is not effective. Such procedure modifications would add to the length and complexity of procedures, with little likelihood of averting similar future deficiencies. This is particularly the case when a deficiency results from a lack of thoroughness in the design change process, such as faulty or incomplete engineering. A number of deficiencies resulted from apparent non-compliance to procedures.

On this basis, most PDCR deficiencies were not resolved with recommendations to revise procedures. More fundamental reasons were sought by the CYPDCTG, and it was concluded that many such deficiencies could be avoided with improved reference documents and training. These reasons are summarized below:

1. In reviewing the PDCRs, the PDCTG has identified a number of short comings associated with the documentation of the current plant design and functional requirements for the system and its components. For example:

a. Drawings are not updated in a timely manner.
b. Boundaries between safety/non-safety equipment, QA, or pressure classifications (ASME class) are not clearly specified.
c. Design basis information is not collected into a single controlled document. The FDSA has not been updated.
d. Normal valve positions are not clearly specified. The current P & IDs are not an accurate source for this information.
e. Original specifications are not available for comparison when developing new specs.
f. While the valve list is used as a source for controlled documentation, it is not a controlled document.

These shortcomings hindered the development of the PDCRs and contributed to the deficiencies found in the detailed evaluations.

2. In reviewing the PDCR packages, a number of documentation deficiencies have been noted that appear to be the result of procedural non-compliance. Additionally, some deficiencies are the result of faulty or incomplete engineering. These deficiencies are correctable by training.

3. Also, some deficiencies involved PDCR packages that were non-specific in their scope description, as is sometimes unavoidable when working in normally inaccessible areas. Other PDCRs were closed out without the completion of all work. These deficiencies warrant procedure changes.

In accordance with CYPDCTG Procedure 1.04, all deficiencies found in PDCRs were reviewed collectively to determine if programmatic deficiencies exist. This review is summarized in Attachment 4, with its recommendations incorporated into the body of this report.

Recommendations

1. Controlled documentation should be expanded to include the following:

a. Current design basis analysis, including positions on current regulatory criteria, system/component design basis criteria, and licensing bases/commitments.
b. Seismic and QA classification (possibly in PMMS).
c. Clear specification of boundaries between QA and safety classifications (possibly in P & IDs and one line diagrams).
d. Normal and failure valve positions (current P & IDs are not accurate).
e. Equipment history, including all specifications used to purchase the equipment (possibly in PMMS).
f. Valve list (possibly in PMMS).

Item (a) could be performed by the updating and controlling of the FDSA.

Consideration should be given to maintaining original plant specifications as controlled documents, much like original plant drawings. For plant design changes, these specifications would be updated and revised, as necessary.

2. Controlled documentation, especially drawings should be updated in a timely manner. In particular, generation of verified "As built" drawings should be performed as soon as possible and not delayed until the close out of the project. This is especially important for projects which extend beyond one refueling outage.

3. Training should be provided to give guidance for content and wording requirements in the PDCR package. This training should emphasize the need for thoroughness and technical excellence. The recent NEO procedure familiarization training course was too generalized for training in the design change process. Detailed training is required on all NEO procedures. Training should highlight some of the deficiencies identified by the CYPDCTG, such as a) the importance of seismic requirements b) consideration of secondary effects c) when a PDCR is required and d) the need to avoid unsupported qualitative statements. To ensure uniformity in the process it is recommended that the training should be performed by the training department.

   Management should work to improve on-the-job training through work assignments. To obtain training and avoid errors, new engineers should work more in support of experienced engineers, rather than assuming direct project responsibility.

4. For cases where a PDCR scope statement must be generalized, NEO 3.03 should require the PDCR package to be revised when the work scope is more specifically determined based upon field inspections, or define an alternate means of review and approval. NEO3.03 should also specify that if a PDCR is closed out without the completion of all work, the completed work must be identified, and the impact on the safety evaluation assessed.

5. The implementation of NEO8.04 "Safety Evaluation of Proposed Changes to Station Procedures" should be expedited to ensure adequate technical review of proposed changes to safety related procedures.

6. The effectiveness of the Quality Assurance Program to ensure compliance with the design change process procedures should be evaluated. The number of deficiencies resulting from procedural non-compliance indicates a potential need to increase the QA involvement in this area.

III-3.0 Process Improvement

In the process improvement area, identified deficiencies were quite varied in type and scope. To permit a better assessment of the CYPDCTG findings in the design change process, the following categories have been established:

1. Definition Deficiencies - deficiencies that result from a lack of a clear definition of work scope or requirements.
2. Interface Deficiencies - deficiencies that result from inadequate interactions of groups or individuals.
3. Completeness Deficiencies - deficiencies that result from a lack of thoroughness.
4. Process/Procedure Deficiencies - deficiencies that specifically relate to the overall process or specific procedures.

A number of the recommendations presented below deal with the concept of an integrated review. This concept consists of a detailed multi-discipline process where experienced discipline individuals with broad oversight evaluate the change to consider such things as safety significance, system interactions, technical requirements, special requirements, cumulative effects, location dependent issues, procedure requirements, etc. This type of review could occur at both the conceptual stage and the approval stage of a design change. It could be performed by a new group, a subcommittee of the NRB, or possibly through the current line organization. Appropriate procedure changes would be necessary to implement the preferred approach.

The following presents the results of the CYPDCTG review by category.

III-3.1 Definition Deficiencies

Summary

In reviewing the PDCRs, Work Permits (WPs) and Automated Work Orders (AWOs,) a number of deficiencies related to the definition of plant design changes have been identified. These are as follows:

a. A number of activities were performed as maintenance that should have been processed as a PDCR.
b. In reviewing the PDCRs, a number of PDCRs have been identified in which the description of the change was not clearly provided.

Discussion

1. There are a number of contributing factors in the misuse of work permits/work orders to make plant design changes:

   a. It is becoming difficult if not impossible to replace plant components with identical models. Some original equipment is no longer manufactured and is obsolete. Some changes were a result of an attempt to replace obsolete or unavailable equipment with comparable equipment.
   b. Some changes are so minor and remote to safety that the PDCR process is not necessary.
   c. Some activities fall into a "gray" area between plant design change and maintenance activities (e.g., SG tube plugging and Fermaniting).

d. The current definition of a plant change in NEO Procedure 3.03 does not appear to be encompassing enough. The "design documents" mentioned in the definition are not clearly specified.
e. Sufficient training or guidance on the meaning of the definition has not occurred.

2. Since the PDCR process is a lengthy and time consuming one, it is difficult to use the PDCR process for changes that require a tight schedule. This is a particular problem for changes that require a survey or walkdown prior to definition of the PDCR. By necessity, this has lead to approval of PDCRs with a general definition rather than a detailed definition of the change. Another undesirable practice is the use of one PDCR to cover a number of seemingly unrelated changes (e.g., PDCR 461, Reactor Cavity Pool Seal and Neutron Shield).

Recommendations

1. A better definition of a plant design change should be developed. It is recognized that any definition is subject to interpretation, but the current definition has not effectively captured areas such as:

   a. Heat exchanger (including steam generator) tube plugging.
   b. Fermaniting.
   c. Replacement with equivalent components.
   d. Insignificant changes that are remote to safety (i.e., changing telephones, adding air conditioners).

   The CYPDCTG recommends that the definition of a plant design change include plant changes that require a change in design documents (the current definition) and changes in the form, fit, material, or function of plant equipment.

2. To ensure that all work that results in a plant change is properly identified, it is recommended that a technical review of AWO's be performed to determine if a plant change is being proposed. AWO's that specify activities such as surveillance or calibration, need not be included in the technical review.

3. In order to reduce the time consuming reviews required for plant changes having no safety significance, a streamlined process is recommended for these types of changes (see Figure 1). A plant design change would be determined to be in one of three categories:

   a. change requires a PDCR (i.e., the current PDCR process), or
   b. change is "remote to safety" (requires only justification for this categorization), or
   c. change is a replacement with an equivalent component (requires only justification for this categorization).

   The AWO can be used to identify the above category of work being performed.

The documentation for a change "remote to safety" can be simply the following:

a. a description of the change, and
b. a conclusion that the change has no functional impact.

This documentation constitutes the safety evaluation.

The definition of a "functional change" given in NEO 5.11 can be supplemented as required to determine functional impact. That is, a change is "remote to safety" if it does not cause any of the following:

a. Alteration of mechanical or structural integrity for safety related systems.
b. Alteration of seismic qualification.
c. Alteration of physical and electrical separation requirements for safety related systems.
d. Alteration of intended electrical circuit design function for safety related systems.
e. Introduction of materials not specifically qualified for the given application or environment.
f. Alteration of the plant fire hazards analysis.
g. Alteration of the control, operation, performance, maintainability, or accessibility for test or inspection for safety related systems.
h. Alteration in plant flood protection.
i. Generation of a missile, means, etc., of disabling or rendering inoperable a safety-related component, structure, electrical circuit, etc. (secondary effects).
j. Generation of a potential environmental impact.
k. Alteration of the plant security system.

4. The current PDCR process appears to be complex and time consuming. It is recommended that an evaluation be made to identify ways of streamlining the process. For example, if a system integration group is created, it may be possible to use such a group to allow a streamlined process by combining technical reviews.

5. Revise NEO3.03 to prohibit a single PDCR being used to cover several unrelated changes. Instead, several PDCRs should be used, one for each change.

III-3.2 Interface Deficiencies

Summary

Several deficiencies have been noted in the selection of the disciplines involved in reviewing a given PDCR. Without proper selection of the disciplines involved, a complete safety review for multi-discipline issues and secondary effects cannot be accomplished.

Discussion

1. The integrated safety evaluation performed by the Safety Analysis Branch is not a multi-discipline review. As such, the term "integrated safety evaluation" is a misnomer. The "integrated safety evaluation" is in fact a discipline evaluation where only the impact of the change on the accident analysis is assessed. It is only an integrated review in that the accident response is the result of the combination of effects of the various systems and components. The integrated safety evaluation requires as an input, the results of multi-discipline reviews. It is not a means of identifying secondary effects, multi-discipline issues or for replacing Failure Mode and Effects Analyses (FMEAs).

2. The NRB is a multi-discipline review board that has the appropriate expertise and the means for performing multi-discipline reviews. However, the NRB has not performed the depth of review to identify system interaction and secondary effects in all instances. In addition, the NRB reviews usually occur after the PDCR process. This is very late for identifying safety concerns.

3. Licensing has, in some instances, performed an integration function for coordination of changes to meet major licensing issues. However, this is the exception rather than the rule.

Recommendations

1. An improvement is required in the performance of integrated multi-discipline reviews. The emphasis of these reviews is the identification of system interactions and secondary effects of changes. A possible way of improving the integrated reviews, for example, is to establish a system integration group responsible for these functions.

2. Guidance is required to assure that all of the appropriate disciplines are selected to be involved in the review and development of PDCR documents. Training for project and plant engineers would improve the selection of disciplines.

III-3.3 Completeness Deficiencies

Summary

In reviewing the PDCRs, the PDCTG has identified a number of generic issues that do not always receive the depth of review that is required. For example:

a. The cumulative effect of a number of changes that have taken place over the years is not always addressed. While each individual change may not be significant, the cumulative effect of many changes may have an impact.

b. Secondary effects are not always completely addressed, especially in assessing the impact of already existing equipment in an area where new Category I equipment is being added.

c. Qualification of equipment has not been performed on a consistent basis. In some instances, qualified equipment is added to existing non-qualified systems. Taking credit for the upgrade on a system basis is questionable.

These deficiencies point to a need for an improvement in the integrated approach in the development and review of plant changes.

Recommendations

1. An improvement is required in the review and coordination of multi-discipline and system interaction issues. A possible way of effecting an improvement is the establishment of a system integration group responsible for these functions.

2. Some controlled documentation should be developed that can be used to determine the impact of location dependent issues (e.g., - fire protection, seismic, flooding, EEQ, etc.). The effects of new equipment on previously existing equipment in that location must be evaluated. Likewise the potential effects of previously existing equipment in the area on the new equipment being added must be addressed. This could be incorporated in an updated FDSA or a data base system.

3. A method for evaluation of the cumulative effect of a number of minor changes should be developed. For example, when core boring a structural wall, the effects of previous core boring on the same wall should be considered. Also, the cumulative effects of small components added to the Main Control Board may be important whereas individually they are qualitatively analyzed away.

III-3.4 Procedures Deficiencies

Summary

These comments address deficiencies in the current NEO and GEC procedures. The actions required to correct these deficiencies fall into two categories:

a. Development of new NEO procedures.
b. Revision of current NEO procedures.

Recommendations

1. Most engineering and design functions occur under a project assignment. The only NEO level procedure that controls activities under a project assignment is NEO3.04. This is more of an administrative rather than a process control procedure. A specification of discipline functions performed under a plant design change is required to determine how the detailed design will proceed. A NEO procedure is required in this area. Important areas for consideration are:

a. Overall design requirements.
b. Conceptual design review.
c. Interface specifications.
d. Integration and multi-discipline requirements.
e. Design documentation requirements.

Current GE & C procedures may be adequate to address these concerns. They should be elevated to the NEO level and integrated into the design process. One good candidate is GEC2.07, Project Description.

2. Specific revisions have been identified for the procedures shown in Table 2.

IV. Conclusions

The conclusion of the CYPDCTG are assessments of the significance of the results presented in the previous section. Our conclusions are:

1. The current plant design change process, as defined by plant, Generation Engineering and Construction, and Nuclear Engineering and Operations procedures, is effective. The system has sufficient controls over the plant modification process.

   This conclusion is firmly supported by the CYPDCTG review of the INPO Good Practice document (Reference 1). In that review, no significant shortcomings in the CYAPCo process were identified. Similarly, reviews of design change programs from two other utilities found the CYAPCo program to be strong. A comparison of the INPO Good Practice and the CY design change process is presented in Attachment 3.

2. While the process framework is effective, compliance with the requirements either through ignorance or lack of concern has been inadequate, at times. Staffing levels may be contributing to the degree of compliance. The task group found a correlation between the work load during the period just after TMI and the number of deficiencies. The company is now in a work force stabilization period with restrictions on new hiring. At the same time construction of Millstone Unit 3 has removed a significant number of experienced people from the operating units support organizations. These two forces have had a dramatic effect on some groups, causing significant increases in individual workloads. This inevitably affects the thoroughness of some projects.

3. Recent revisions to the NEO Procedures have improved the controls on the design change process. The process, however, is cumbersome. Some CYPDCTG recommendations intend to streamline the process, but their impact is probably small. Some of the procedures appear to be disjointed, apparently due to parallel development and revision. Some modifications for consistency are needed.

4. As stated in the recommendations, a number of deficiencies should be corrected in the process. These deficiencies do not have a significant adverse impact on the effectiveness of the entire program.

5. Certain activities already in process within NU address some of the CYPDCTG recommendations. Specifically, a proposed configuration control program will establish an adequate compilation of updated design information, if it meets its goals. The CYPDCTG is concerned, however, about the timely completion of such a project. Additionally, the current effort to correct P&IDs is a necessary activity.

6. As stated in the recommendations, numerous improvements can be made to the plant design change process. A summary of all process recommendations is presented in Table 1. A concerted effort should be made to ensure all procedures interrelate effectively. Confusion results when one procedure offsets the requirements of another procedure. Care must be taken during procedure revisions to eliminate such conflicts.

7. The numerous instances of "non-compliance" to procedural requirements can be reduced by more effective training. Training in specific procedures should be conducted by the Training Department and be mandatory for all project engineers, NUPOC engineers and supervisors.

Figure 1 - Proposed Processing of Plant Design Changes

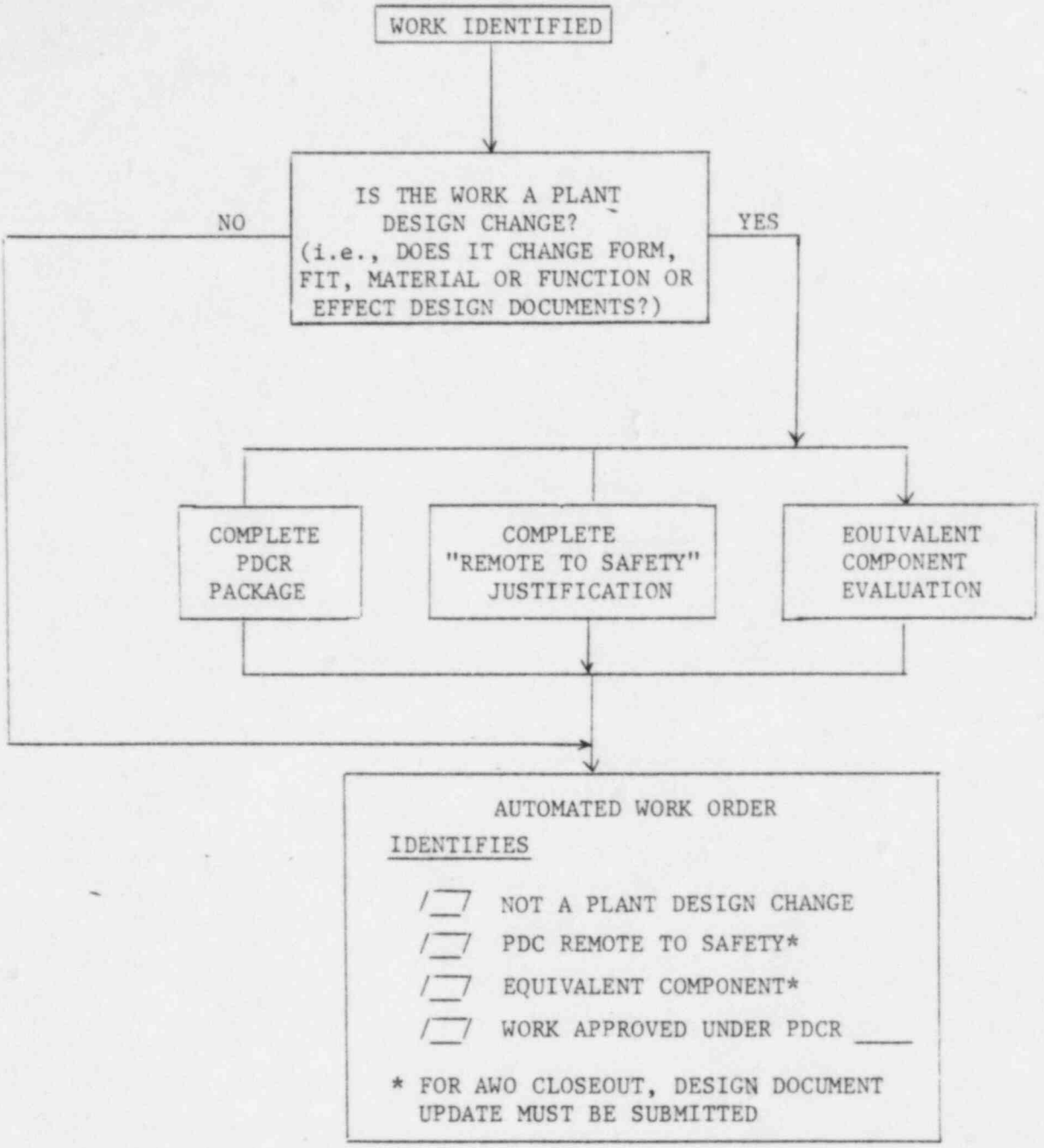


TABLE 1

DESIGN CHANGE PROCESS RECOMMENDATIONS

Number	Type	Recommendation
1	Corrective	Expand scope of controlled documentation to include design bases, classifications, and other information.
2	Corrective	Improve timeliness and quality of "as built" documentation updating.
3	Corrective	Provide training on the plant modification process.
4	Corrective	Revise NEO3.03 to address PDCRs of general scope and PDCRs not completed.
5	Corrective	Expedite the implementation of NEO8.04.
6	Corrective	Evaluate the effectiveness of the QA program to ensure compliance with process procedures.
7	Definition	Develop a more effective definition of "plant design change".
8	Definition	Perform a technical review of specified categories of Automated Work Orders.
9	Definition	Develop a simplified means to document plant design changes that are "remote to safety" or "equivalent component".
10	Definition	Attempt to streamline PDCR process.
11	Definition	Revise NEO3.03 to prohibit unrelated changes on a single PDCR.
12	Interface	Provide improved multi-discipline reviews and integration.
13	Interface	Provide guidance/training on the interface needs/reviews on technical documents.
14	Completeness	Improve incorporation of system interaction criteria and secondary effects in design changes.

Number	Type	Recommendation
15	Completeness	Develop controlled documentation for evaluating the impact of location dependent issues (e.g., seismic, fire protection, flooding, EEQ).
16	Completeness	Develop means to evaluate the cumulative effects of a number of minor changes (e.g, core boring, control board additions).
17	Procedures	Develop an NEO-level procedure on project descriptions, perhaps elevating GEC Procedure 2.07.
18	Procedures	Address the recommendation in Table 2 on specific procedure changes.

TABLE 2 - PROCEDURE DEFICIENCIES

Procedure	Deficiencies
NEO7.01	Add requirement for the appropriate QC group and the Design group to be responsible for verification of "As Builts".
NEO5.05	Design verification can be performed using independent review, alternate calculation or testing. The procedure should be revised to require a decision and indication of the method of design verification.
NEO7.03	1. Revise to include review and approval of test procedures. 2. Revise as necessary to include NUSCO managers/supervisors in the Instruction Section to reflect the Responsibility Section. 3. Clarify the definitions for Retest, Pre-Operation Test, Phase I Test and Phase II test to indicate the distinction between the terms. 4. Reorder as necessary the substeps in Step 6.3. 5. Clarify the term "ultimate acceptance".
NEO7.02/3.03	Step 6.2.2.2 of 7.02 specifies walkdown criteria be determined in the PDCR. However, this is not specified in NEO 3.03. Revise either 7.02 or 3.03 to be consistent.
NEO7.02	Define the requirements for a pre-construction meeting that is shown in the flow chart.
NEO7.01	1. Resolve conflict between parallel review specified in step 6.16 and sequential review shown in the flow chart for OUES and QC. 2. Reword step 6.2.4 to clarify the timing of inspection requirements. The wording implies that inspection is completed prior to approval of work order.

Procedure	Deficiencies
	3. Define Unit Engineer as indicated in step 6.4.
	4. Step 6.16 is performed by the Job Supervisor while the flow chart shows that it is performed by the originator. Resolve this conflict.
NEO7.01,7.02 and 7.03	Resolve conflicting definition of when turnover occurs.
NEO5.15	Develop and release in a timely manner.
NEO5.11	Add documentation indicating whether or not there is an impact on the safety or environment rev ws on Figure 7.2.
NEO5.05	Some items do not seem appropriate for the checklist, Figure 7.1. For example, 31, and 32 appear to address questions raised after the document review has been completed. Review each item on the list for appropriateness and revise as necessary.
NEO5.05/3.03	Clarify the application of the design input documentation requirements. For example, refer to NEO5.05 in step 6.2.3.4 of NEO3.03.

REFERENCES

1. Good Practice TS-402, "Plant Modification Control Program", Institute of Nuclear Power Operations, May, 1985.

2. Good Practice OP-202, "Temporary Modification Control", Institute of Nuclear Power Operations, May, 1985.

ATTACHMENT 1

CONNECTICUT YANKEE

PLANT DESIGN CHANGE TASK GROUP

PROCEDURE 1.04

REVIEW OF THE PLANT DESIGN CHANGE PROCESS

SUBMITTED BY _____
Chairman,
Plant Design Change Task Group

APPROVED _____
Vice President,
Nuclear and Environmental Engineering

REVISION 1.A

DATE _____

CONNECTICUT YANKEE

PLANT DESIGN CHANGE TASK GROUP

PROCEDURE 1.04

REVIEW OF THE PLANT DESIGN CHANGE PROCESS

1.0 PURPOSE

This procedure provides the means to (1) determine the adequacy of the current NU Design Change Process for performing modifications at nuclear units in light of the CY Plant Design Change Task Group (CY PDCTG) efforts and (2) recommend improvements to same.

2.0 APPLICABILITY

This procedure applies to the review of Plant Design Change Requests performed by Task Group Members.

3.0 REFERENCES

3.1 CY Plant Design Change Task Group Procedure 1.03 Plant Design Change Evaluations.

3.2 CY Plant Design Change Task Group Procedure 1.02 Plant Design Change Screening.

4.0 DEFINITIONS

4.1 Lead Reviewer

CY PDCTG Member assigned by the Chairman to determine the adequacy of current NU Design Change Process Procedures in light of (a) identified deficiencies from Reference 3.1 and Figure 7.2 of this procedure, and (b) review of specific PDCR's identified by the CY PDCTG.

The Lead Reviewer may be any Task Group Member.

4.2 Current NU Design Change Process Procedures

These procedures include, as a minimum, the NEO Policies and Procedures and the Generation Engineering and Construction Department Procedures. Procedures in effect as of June 1, 1985 will be used as required by this procedure. No subsequent procedure revisions will be acknowledged for purposes of this review. Attachments 8.A and 8.B define these procedures and appropriate revisions.

5.0 RESPONSIBILITIES

5.1 Vice President - Nuclear and Environmental Engineering

Responsible for the review and approval of this procedure.

5.2 CY PDCTG Chairman

Responsible for the following:

5.2.1 Assigning Lead Reviewers.

5.2.2 Transmitting Plant Design Change Process Recommendations on areas of immediate concern to the Vice President, Nuclear and Environmental Engineering.

5.2.3 Forwarding to the Vice President, Nuclear and Environmental Engineering, all recommended procedural changes after concurrence by the CY PDCTG.

5.3 Lead Reviewer

Responsible for the following:

5.3.1 Evaluating the adequacy of current NU Design Change Process Procedures in light of (a) identified deficiencies from Reference 3.1 and Figure 7.2 and (b) review of specific PDCR's identified by the PDCTG.

5.4 CY PDCTG Members

Responsible for the following:

5.4.1 Concurring in the recommended changes to NU Plant Design Change Process Procedures.

5.4.2 Initiating Figure 7.2 when design procedure comments are identified which are not related to specific plant design changes.

5.4.3 Identifying PDCR's to be reviewed in light of specific design process phases.

5.5 Lead Evaluator (of Reference 3.1)

Responsible for the following:

5.5.1 Completing Section I of Figure 7.1 of this procedure as each deficiency is identified.

6.0 INSTRUCTIONS

6.1 General

As required by Reference 3.1, the Lead Evaluator will review the plant design changes to determine if a negative impact on safety has occurred. During this review, deficiencies in the plant design change may be identified. Those such deficiencies will be entered on Figure 7.1 of this procedure. Each of these deficiencies shall be reviewed via the requirements of this procedure to determine (1) if NU current Plant Design Change Process Procedures adequately preclude similar deficiencies from occurring and (2) if revisions to NU current Plant Design Change Process Procedures are warranted to prevent similar future occurrences.

Figure 7.2 provides the means to identify design process deficiencies which are noted during CY PDCTG non-evaluation activities. These deficiencies will be addressed in a similar manner as those from Reference 3.1.

To ensure all phases of the NU design process have been adequately reviewed, the CY PDCTG will judiciously select plant design changes for review of specified areas within the design process. Deficiencies identified will be addressed in a similar manner as those from Reference 3.1.

6.2 Design Change Process Evaluation

6.2.1 For each process deficiency noted by Section II, Figure 7.5 of Reference 3.1, Section I of Design Change Process Evaluation (Figure 7.1 of this procedure) shall be completed by the Lead Evaluator. For subsequent identical deficiencies, Section I of Figure 7.1 may reference the first completed Figure 7.1 to eliminate duplications.

6.2.2 The Lead Reviewer shall complete Sections II and III of Figure 7.1 indicating the applicability and adequacy of the current procedures. To assure that each Design Process Evaluation has been dispositioned correctly, a meeting of the CY PDCTG shall confirm the Design Change Process Evaluations. Each member signifies his concurrence by signing Section IV of Figure 7.1.

6.2.3 The completed Figures 7.1 shall be filed in either of two files. If no procedural improvements have been identified, the appropriate Figures 7.1 shall be placed in the "No Action Required" file. Those which identify specific procedural improvements, shall be placed in the "Action Required" file.

A Plant Design Change Status Log shall be maintained by the PDCTG Chairman indicating when each Design Change Process Evaluation starts and is completed. Immediate concerns shall be transmitted to the Vice President, Nuclear and Environmental Engineering.

6.2.4 Upon completion of the disposition of all deficiencies from Reference 3.1, the CY PDCTG shall review the "Action Required" file collectively to determine if programmatic deficiencies exist. Also, recommended procedure revisions will be compiled in a final report to the Vice President, Nuclear and Environmental Engineering. Programmatic strengths shall also be identified where possible.

6.2.5 At any time during the review of plant design changes, a PDCTG Member may identify a procedural deficiency not specifically related to a plant design change. For these instances, Figure 7.2 shall be completed and placed in the "Action Required" file for evaluation per Section 6.2.4.

6.2.6 For each plant design change identified by the CY PDCTG for design process review, Figure 7.3 shall be completed. Areas of review will be concurred in by the CY PDCTG. Design Process Deficiencies will be noted on Figure 7.1 and will be placed in the "Action Required" file for evaluation per Section 6.2.4.

7.0 FIGURES

Figure No.	Figure Title
7.1	Design Change Process Evaluation
7.2	CY PDCTG Member Design Change Process Procedure Comment
7.3	Plant Design Change Specific Design Process Review
7.4	Plant Design Change Process Review Flow Chart

8.0 ATTACHMENTS

8.A Nuclear Engineering and Operation Procedures.

8.B Generation Engineering and Construction Division Procedures

Figure 7.1

Design Change Process Evaluation

Plant Design Modification No. _____

I. Deficiency (from Reference 3.1, Figure 7.5, Section II or CY PDCTG Selected PDCR Review, Figure 7.3)

II. Interface Considerations

Could this deficiency have been detected during the review process if the design change had been reviewed by a discipline in addition to those who actually performed the design review?

III. Deficiency Category(s):

Applicable		Category	NU Current Procedures			
Yes	No		Applicable	SAT*	UNSAT**	Procedure No.
			Yes	No		
/	/ /	Engineering and Design				
			/ /	/ /	/ /	/ / NEO 3.03
			/ /	/ /	/ /	/ / NEO 3.04
			/ /	/ /	/ /	/ / NEO 3.10
			/ /	/ /	/ /	/ / NEO 5.03
			/ /	/ /	/ /	/ / NEO 5.04
			/ /	/ /	/ /	/ / NEO 5.05
			/ /	/ /	/ /	/ / NEO 5.06

Procedure 1.04

III. Deficiency Category(s): (Continued)

Applicable		Category	NU Current Procedures				
Yes	No		Applicable		SAT*	UNSAT**	Procedure No.
			Yes	No			
			/ /	/ /	/ /	/ /	NEO 5.11
			/ /	/ /	/ /	/ /	NEO 5.12
			/ /	/ /	/ /	/ /	NEO 6.01
			/ /	/ /	/ /	/ /	NEO 6.02
			/ /	/ /	/ /	/ /	GEC 2.04
			/ /	/ /	/ /	/ /	GEC 2.06
			/ /	/ /	/ /	/ /	GEC 3.01
			/ /	/ /	/ /	/ /	GEC 3.05
			/ /	/ /	/ /	/ /	GEC 3.07
			/ /	/ /	/ /	/ /	Other ____
/ /	/ /	Construction					
			/ /	/ /	/ /	/ /	NEO 3.03
			/ /	/ /	/ /	/ /	NEO 5.11
			/ /	/ /	/ /	/ /	NEO 6.03
			/ /	/ /	/ /	/ /	NEO 7.01
			/ /	/ /	/ /	/ /	GEC 5.06
			/ /	/ /	/ /	/ /	GEC 5.07
			/ /	/ /	/ /	/ /	GEC 5.08
			/ /	/ /	/ /	/ /	GEC 5.09
			/ /	/ /	/ /	/ /	Other ____

III. Deficiency Category(s): (Continued)

Applicable		Category	NU Current Procedures				
Yes	No		Applicable		SAT*	UNSAT**	Procedure No.
			Yes	No			
/ /	/ /	Inspection					
			/ /	/ /	/ /	/ /	NEO 3.03
			/ /	/ /	/ /	/ /	NEO 3.09
			/ /	/ /	/ /	/ /	NEO 3.10
			/ /	/ /	/ /	/ /	NEO 7.03
			/ /	/ /	/ /	/ /	NEO 7.02
			/ /	/ /	/ /	/ /	Other ____
/ /	/ /	Pre-Operational Testing/System Turnover					
			/ /	/ /	/ /	/ /	NEO 3.03
			/ /	/ /	/ /	/ /	NEO 7.02
			/ /	/ /	/ /	/ /	NEO 7.03
			/ /	/ /	/ /	/ /	Other ____
/ /	/ /	Procedures/Training					
			/ /	/ /	/ /	/ /	NEO 3.03
			/ /	/ /	/ /	/ /	NEO 7.02
			/ /	/ /	/ /	/ /	NEO 7.03
			/ /	/ /	/ /	/ /	Other ____

* Current Procedure is Adequate. Complete Section III as appropriate.

** See Section III for recommended revision(s).

IV. Summary of Evaluation

/ / No procedural revision(s) is (are) recommended.

The following procedure revision(s) is (are) recommended based upon the preceeding detailed evaluation(s):

Lead Evaluator _____

V. CY PDCTG Concurrence of the Preceeding Evaluation(s)

_____ _____ _____

_____ _____ _____

CY PDCTG Member Design Change Process Procedure Comment

Figure 7.2

The following design change process procedure deficiency has been noted.

The following procedural revision(s) is (are) recommended based upon the above information.

_____
CY PDCTG Member

CY PDCTG Resolution:

CY PDCTG:

R. J. Schmidt	C. E. Cornelius
B. A. Tuthill	D. G. Diedrick
M. S. Kai	R. A. Crandall

FIGURE 7.3

DETAILED REVIEWS OF SELECTED PLANT DESIGN CHANGES

Plant Design Change No. _____

Title: _____

A review of the following design process categories will be performed, as indicated, to identify possible improvements in the overall NU design process.

(Circle appropriate categories to be reviewed)

Engineering
Design
Construction
Inspection
Pre-operational Testing
Turnover
Training

Justification is as follows for not selecting the above categories for further review:

CY PDCTG Approval:

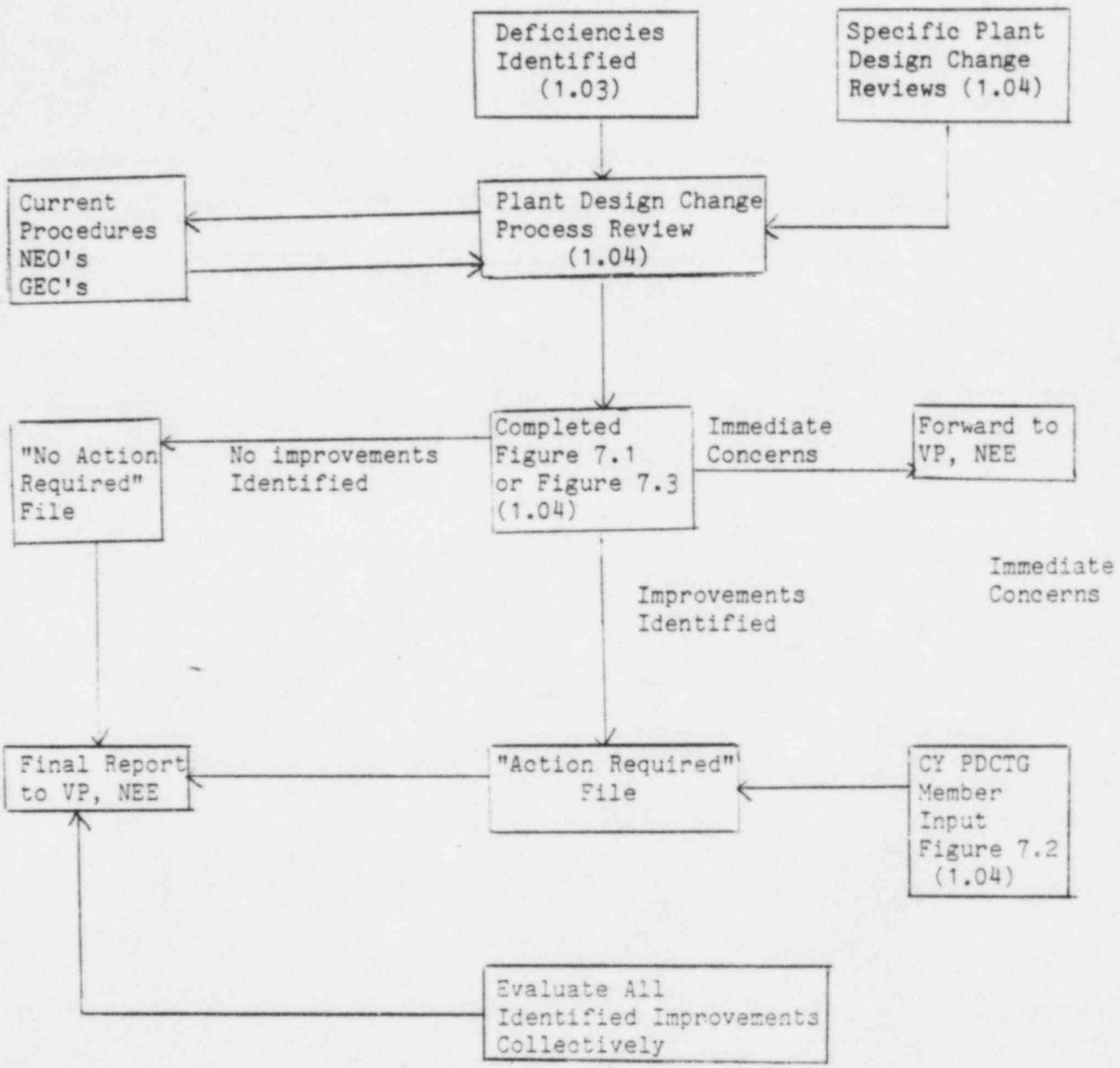
_____ _____

_____ _____

_____ _____

Figure 7.4

Plant Design Change Process Review
Flow Chart



ATTACHMENT 8A

NUCLEAR ENGINEERING AND OPERATION PROCEDURES

TABLE OF CONTENTS - 100 SERIES

Administrative

No.	Rev.	Issue Date	Procedure Title
1.01	2	02/08/85	Organization of the Nuclear Engineering and Operations Group
1.02	2	11/01/84	Scope and Function of Nuclear Engineering and Operations Policies and Procedures Manual
1.03	2.A	03/15/85	Format and Content of Nuclear Engineering and Operations Procedures
1.04	2	11/01/84	Preparation, Issuance, and Control of Nuclear Engineering and Operations Procedures
1.05	0	06/11/82	Documentation of Telephone Conversations
1.06	0	06/11/82	Documentation of Meetings
1.07	1	12/30/83	Review of Nuclear Engineering and Operations Procedures as Required by Revisions to Northeast Utilities Quality Assurance Program Topical Report
1.08	-	Scheduled	NEO Policies (Preparation, Issuance, and Control of)
1.09	0	12/14/84	Overtime Controls for Personnel Working at the Operating Stations

NUCLEAR ENGINEERING AND OPERATION PROCEDURES

TABLE OF CONTENTS - 200 SERIES

Programs

No.	Rev.	Issue Date	Procedure Title
2.01	1	03/15/85	Implementation of the requirements of Part 21 of Title 10, Code of Federal Regulations: Reporting of Defects and Noncompliance
2.02	1	03/20/85	Charter for Nuclear Review Boards
2.03	1	09/28/84	Nuclear Training
2.04	2.A	11/01/84	Response Organizations for Nuclear Incidents
2.05	0.A	11/01/84	Maintaining Occupational Radiation Exposure ALARA (As Low as Reasonably Achievable)
2.06	2	03/01/85	Operating Experience Assessment and Utilization
2.07	0	1[illegible]/23/81	Management of In-Service Inspection Programs
2.08	1	12/03/84	Management Review of the Northeast Utilities Quality Assurance Program
2.09	0	02/28/83	Computer Tracking Program
2.10	0.A	11/01/84	Safeguarding Supplier Proprietary Material
2.11	1	12/14/84	Trend Analysis from Quality-Related Documents
2.12	0	08/30/82	Control of Nuclear Facilities Safeguards Information
2.13	0.A	07/12/84	Management of Nuclear Power Plant Records
2.14	0	05/05/83	Nuclear Plant Fire Protection Program
2.15	1	02/15/85	Nuclear Complaints and Concerns
2.16	0	06/10/83	Quality Assurance Plant Audit Program
2.17	-	Scheduled	Chemistry Control and Monitoring Program
2.18	0.A	11/01/84	Corrective Action
2.19	-	Scheduled	Independent Safety Engineering Group Organization and Function

NUCLEAR ENGINEERING AND OPERATION PROCEDURES

TABLE OF CONTENTS - 300 SERIES

General and Quality Processes

NUCLEAR ENGINEERING AND OPERATION PROCEDURES

TABLE OF CONTENTS - 400 SERIES

Licensing

NUCLEAR ENGINEERING AND OPERATION PROCEDURES

TABLE OF CONTENTS - 500 SERIES

Engineering and Design

NUCLEAR ENGINEERING AND OPERATION PROCEDURES

TABLE OF CONTENTS - 600 SERIES

Procurement and Material Control

NUCLEAR ENGINEERING AND OPERATION PROCEDURES

TABLE OF CONTENTS - 700 SERIES

Operating Plant Modifications

NUCLEAR ENGINEERING AND OPERATION PROCEDURES

TABLE OF CONTENTS - 800 SERIES

Operations and Maintenance Procedures

GENERATION ENGINEERING AND CONSTRUCTION DIVISION PROCEDURES MANUAL

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ATTACHMENT 2

PROCESS REVIEW MATRIX

OBS	PDCRNO	TITLE	LEAD	ENG	DESIGN	CONSTR	INSP	TEST	TURNOVER	TRAINING
1	290	REROUTE OF CHARGING PUMP POWER SUPPLY	GEC	N	N	N	N	N	N	N
2	294	RHR PURIFICATION FLOW CONTROL VALVE	GEC	N	N	N	N	N	N	N
3	300	DIESEL SEQUENCING TIMERS	BAT	N	N	YES	YES	YES	N	N
4	306	CONTAINMENT FAN FILTER TIMERS	RAC	N	N	N	N	N	N	N
5	314	VITAL AREA PROTECTION OF CONTROL ROOM	DGD	N	N	YES	N	N	N	N
6	326	FIRE SUPPRESSION SYS ADDITIONS & MODS	MSK	N	N	N	N	N	N	N
7	332	AUX FEEDPUMP BEARING OIL COOLING SYS	MSK	N	N	YES	N	N	N	N
8	333	COMBUSTIBLE GAS DETECTION SYSTEM	RAC	YES	YES	N	N	YES	YES	N
9	344	CONTAINMENT ISOLATION RESET MOD	BAT	YES	YES	YES	YES	YES	YES	YES
10	347	RCS VENTING SYSTEM	RAC	YES	YES	N	N	YES	N	YES
11	368	RCP SEAL WATER SUPPLY	RAC	N	N	N	N	N	N	N
12	371	H20 LEVEL/H2Z/PRESS IN CONT TMI 2.1.8	RAC	N	N	N	N	YES	N	YES
13	380	RCP CCW AND SEAL WATER RETRN ISOLATION	RJS	YES	YES	YES	YES	YES	YES	YES
14	384	AUTOMATIC INITIATION AUX FEEDWATER	MSK	YES	YES	N	N	YES	N	YES
15	388	PRIMARY VENTILATION STACK SPRAY RING	GEC	N	N	N	N	N	N	N
16	397	PAM AUX MAIN CONTROL BOARD	DGD	N	N	YES	N	N	YES	N
17	401	SAFETY GRADE AUTO INITIATION AUX FW	MSK	N	N	N	N	N	N	N
18	406	BUILDING MODIFICATION PROJECT	DGD	N	N	N	N	N	N	N
19	418	PORV AND BLOCK VALVE LOGIC MOD TO 2/3	RAC	N	N	N	N	N	N	N
20	436	UPGRADE OF SFB NORTH CRANE (CR-5-1A)	GEC	N	N	N	N	N	N	N
21	443	FLOOD PROTECTION MODS	DGD	N	N	N	N	YES	N	N
22	459	REEVALUATION OF SAFETY RELATED PIPING	GEC	YES	YES	N	N	N	N	N
23	460	HACSS	RJS	YES	YES	YES	YES	N	N	N
24	461	NEW RX CAVITY POOL SEAL & NEUT SHIELD	RAC	YES	YES	N	N	N	N	N
25	486	TERRY TURBINE STEAM CONTROL VALVES	MSK	N	N	YES	YES	YES	YES	YES
26	513	BORIC ACID LINE RELOCATION	GEC	N	N	N	N	N	N	N
27	592	CHARGING PUMP MODIFICATIONS	BAT	YES	YES	YES	YES	YES	YES	YES
28	604	WASTE GAS/H2-N2 SUPPLY	BAT	N	N	N	N	N	N	YES
29	626	REPLACE FOXBORO 613DM FW FLOW TRANSMIT	RJS	N	N	YES	N	N	N	N
30	634	REPLACE FOXBORO PRESS TRANS PT403 & 404	MSK	N	N	N	N	N	N	N
31	652	SG PRIMARY MANWAY COVER STUD TENSIONER	DGD	N	N	N	N	N	N	YES
32	653	VITAL INVERTER CABINET VENTILATION	RJS	YES	YES	YES	YES	N	N	N
33	660	SFP HEAT EXCHANGER RELIEF VALVE	ALT	N	N	N	N	N	N	N
34	671	STORAGE OF SPARE CRD'S IN CONT SUMP	GEC	N	N	N	N	N	N	N
35	684	REPLACEMENT OF RCS LOOP RTD'S	BAT	N	N	N	N	YES	N	N
36	422	INSTALL POST ACCIDENT SAMPLING SYSTEM	RAC	YES	YES	YES	YES	YES	YES	YES
37	544	TANK HEATING SYSTEM MODIFICATION	GEC	YES	YES	YES	YES	YES	YES	YES
38	547	TANK HEATING SYSTEM MODIFICATION	GEC	YES	YES	YES	N	YES	N	N
39	622	CORE COOLING USING PORV'S (FEED/BLEED)	RJS	YES	YES	N	N	YES	N	N
40	597	RHR VALVES INTERLOCK	MSK	YES	YES	YES	YES	YES	YES	YES

ATTACHMENT 3

Comparison with INPO Good Practice

OBJECTIVE:

To review the Plant Modification Control Program recommended by INPO (Good Practice TS-402/INPO 85-013, dated May, 1985) against the NU Design Process defined in CYPDCTG Procedure 1.04.

DISCUSSION:

The INPO Plant Modification Control Program has been reviewed, with its recommendations correlated to the appropriate CYAPCo procedure which implements each recommendation. Several fundamental differences between the INPO and CYAPCo programs must be recognized. First, the INPO program is applicable to all permanent plant modifications (except setpoint changes, temporary lead shielding, and computer software administrative controls) regardless of QA or safety classification. Secondly, the INPO program does not reflect a design and engineering organization, like NUSCO, which is separate from the operating plant staff. Lastly, the INPO program requires the modification safety evaluation (10CFR50.59, FSAR, etc.) be developed from the conceptual design package not the detailed design package. The NEO procedure applies safety evaluations to the detailed design package only.

CONCLUSIONS/RECOMMENDATIONS:

The NU Design Process adequately reflects the modification control program recommended by INPO. In some instances, the NU Design Process exceeds INPO

recommendations. However, two areas of improvement will further strengthen the overall NU Design Process. These are:

1. Issue a NE&O procedure providing criteria for identifying and controlling operations critical drawings. Current requirement in NE&O 3.03 (PDCR's) is marginally adequate.

2. The Design Change Notice (DCN) form (Figure 7.2 of NE&O 5.11) should provide an analysis of the change as it relates to the overall project safety evaluation. This revision will ensure DCN's will not alter the overall plant safety of the project.

(These recommendations are reflected in the body of the report).

ATTACHMENT 4

Integrated Evaluation of PDCR Deficiencies

As required by CYPDCTG Procedure 1.04, an integrated evaluation of all of the individual deficiency process review evaluations (Fig. 7.1's) was performed. The intent of this integrated approach was to determine whether any trends in individual deficiencies highlighted any programmatic deficiencies which were not evident from other reviews of the design process.

The individual Fig. 7.1's were categorized as shown in Table 1. A discussion of each category is provided as follows:

1. Seismic Concerns - 11.

   These items involved the lack of appropriate seismic evaluations of the change for the component itself, primarily for secondary effects, or for the seismic qualification of the system being modified. Although a significant number of such deficiencies were identified, sufficient recommendations have been developed to ensure minimization of such deficiencies in the future. These recommendations include the need to expand controlled documentation to include seismic classification of systems and components (possibly in PMMS) and the need for training to specifically address the consideration of seismic and secondary effects during the design phase.

2. Design Basis Concerns - 8.

These items resulted primarily from the lack of a well documented, up-to-date design basis document. Hence, the consequences of some changes were not adequately analyzed for their effect on the safety analyses. Many of these deficiencies would not have occurred with the current requirement to perform an integrated safety evaluation and with the post seal failure philosophy of asking "What-if?". Additionally, a recommendation has been included for the need for an updated design basis document.

3. System Concerns - 5.

These items resulted from the failure to address overall system requirements or system interactions while changing a component on a system. Some of these may not have occurred with the current requirement to perform an integrated safety evaluation. Additionally, the recommendation to develop an integrated review requirement would ensure system effects are evaluated.

4. Calculation Concerns - 2.

These items appear to be isolated cases. A review of many other calculations indicated good control of calculations. No recommendations are warranted.

5. Misc. Design Detail Concerns - 4.

These are isolated, unrelated cases of missing a minor detail in the engineering/design aspect of a change. This number of findings is expected based on the extent of changes reviewed. No recommendations are warranted.

6. Pre-operational Testing Concerns - 5.

These are cases where the pre-operational testing which was performed was inadequate since it failed to confirm the modification could perform all of its intended functions. The development of NEO 7.03 in 1984 which is a new procedure on pre-op testing should resolve these concerns. No further recommendations are warranted.

7. Surveillance Procedure Concerns - 8.

These concerns involved inadequacies in establishing appropriate surveillance, calibration and preventative maintenance procedures to ensure continued proper operation of the change. The recent development of a formal turnover procedure (NEO 7.02) and a more detailed requirement on station procedure revisions resulting from design changes in NEO 3.03 should ensure such concerns are resolved in the future. No further recommendations are warranted.

8. Operating Procedures/Training Concerns - 5.

These items involved inadequacies or inconsistencies in the operating procedures or operator training as compared to design calculations or the design function of a particular change. As in Item 7 above, recent changes in NEO 3.03 and development of NEO 7.02 should resolve some of these concerns. However, unlike Item 7 above, some of these operating procedure deficiencies were technical problems within the procedure rather than a failure to develop the necessary procedures.

Current activities call for the issuance of a new NEO Procedure, NEO 8.04 - Safety Evaluation of Proposed Changes to Station Procedures. This procedure should ensure a more thorough technical review of procedures with any safety significance. It is therefore recommended that this procedure be implemented as soon as practical.

9. Drawing Update Concerns - 3.

These items involved the failure to update drawings properly following a change. Recommendations have been made on the need for timely and verified drawing updates. No further recommendations are warranted.

10. Misc. - Overall Process - 5.

These were isolated, unrelated concerns with some aspect of the overall design process. Most of these resulted in process recommendations. No common trend was evident and hence no further recommendations are warranted.

CONCLUSIONS

An integrated review was performed by evaluating the trends in the individual deficiencies as described above. Trends were indicated, but for the most part have either been corrected through recent procedure revisions or have been recognized through other means in this report and appropriate recommendations have been made. The one exception was the resulting recommendation to expedite the implementation of NEO 8.04 to ensure technically adequate safety related procedure changes.

The PDCTG also took an integrated look at the root cause of each deficiency in addition to the above approach which looked at the various aspects of the process (e.g., Design, Testing, etc.). The conclusions of this root cause evaluation are as follows:

1. The procedural framework established for the control of the design change process is good. Very few of the discrepancies resulted from inadequate procedures and those that did have been corrected by recent (Nov. 1984) revisions. Some streamlining and clarification of procedures is possible, but they adequately ensure all required

aspects of design process control are incorporated.

2. The primary cause for most of the discrepancies was a lack of compliance or lack of thoroughness in compliance with the procedures in effect at the time. This lack of compliance in itself is due to a combination of many factors including the heavy workload associated with the TMI lessons-learned time period and now the MP3 start-up efforts, the lack of an adequate training program in the design change process, and the use of Junior Engineers as Project Engineers.

   Although some appropriate recommendations have been made, it may take some time to correct some of the above causes for procedural non-compliance or ability to be thorough. Hence, it is also recommended that an evaluation be performed of the effectiveness of the Quality Assurance efforts in the area of design change control and compliance with the applicable NEO and GEC procedures.

ATTACHMENT 4

TABLE 1

Categorization of PDCR Deficiencies

Design Aspects	Number of Deficiencies
Seismic Concerns	11
Design Basis Concerns	8
System Concerns	5
Calculation Concerns	2
Misc. Design Detail Concerns	4
Construction/Installation/Pre-op Testing	
Pre-op Testing Concerns	5
Continued Operation Aspects	
Surveillance Procedure Concerns	8
Operating Procedures/Training Concerns	5
Drawing Update Concerns	3
Misc. - Overall Process	5
TOTAL	56