CONNECTICUT YANKEE

PLANT DESIGN CHANGE TASK GROUP

MILESTONE REPORT

PLANT DESIGN CHANGE EVALUATIONS

SUBMITTED BY

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DATE July 19, 1985

CONNECTICUT YANKEE

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EXECUTIVE SUMMARY

The Connecticut Yankee Plant Design Change Task Group (CYPDCTG) was established in January, 1985 in response to an NRC order dated December 13, 1984. This is the second milestone report of the CYPDCTG, addressing the detailed evaluation phase of the Task Group's effort. This phase consisted of evaluating all the plant design changes selected in the screening process to ascertain if unanalyzed failure modes or more severe consequences or failures were created by the modification.

The task group performed a detailed evaluation of the 35 Plant Design Change Requests (PDCR's) selected in the screening review, as listed in Table 1. These evaluations were performed using records, interviews and/or site inspections to ascertain the adequacy and present status of the modification.

The task group determined that 11 of the plant design changes reviewed did not have any deficiencies which would require further review or corrective action. The remaining 24 plant design changes were found to have deficiencies for further review or corrective action. Each deficiency was also evaluated against the current design change process to determine if improvements in the process were needed.

The most frequent source of identified deficiencies was the seismic qualification of equipment. The most significant deficiencies identified in the evaluation are:

A. Incomplete consideration of charging system outleakage in dose analysis and Tech. Specs.

B. Lack of seismic qualification of the service water system and portions of CVCS.

C. Apparent degradation of containment isolation under certain conditions.

D. Inability to perform a cold reactor shutdown following a seismic event using only qualified components/systems.

I. INTRODUCTION

The CYPDCTG completed the initial phase of screening 355 PDCRs and 12 jumpers/bypass on May 6, 1985. The screening process identified 35 PDCRs for a detailed evaluation as documented in the Screening Milestone report, May 8, 1985. The 35 PDCRs are listed in Table 1.

The detailed design change evaluation of 35 PDCRs was conducted in the period from May 6, 1985 to July 15, 1985.

In general this review was conducted by the PDCTG members with the assistance of the designated liaisons within the company. In four instances alternate members were required because of the detailed involvement of two Task Group members in the original PDCRs. The PDCRs involved were:

384/401 Automatic Initiation of Auxiliary Feedwater
Electrical discipline

347 RCS Venting System
Electrical and Mechanical discipline

660 SFP Heat Exchanger Relief Valve
Mechanical discipline

II. METHOD

Detailed evaluations of the 35 PDCRs selected from the screening process were conducted in accordance with CYPDCTG Procedure 1.03 (Attachment 1). The basic review process outlined by this procedure required the following:

1. If a member of the task group was instrumental in the implementation of the original PDCR, arrangements were made for assignment of an alternate evaluator with similar technical experience prior to the Scope Review.

2. A Scope Review was conducted to outline the areas requiring detailed evaluation and assign lead/support reviewers. One of the reviewers was designated as lead reviewer to write a final summary of the detailed evaluation. The Scope Review considered three primary phases for evaluation:

   A. Impact on the Plant Design Basis.
   B. Confirmation of Proper Implementation.
   C. Provisions for Continued Safe Operation.

3. Detailed evaluations were performed based on the concerns identified in the screening and scoping reviews and any additional facts which surfaced in the conduct of the detailed evaluation.

In performing the detailed evaluations the PDCTG members used the available documentation. Personnel involved or knowledgeable in the specific change, were often contacted for information. Where new technical input was required, a discipline liaison was typically charged with producing this information.

In a number of instances, on site inspections and walkdowns were conducted. These were used to assess the adequacy of the changes and to verify that the implementation of the change is consistent with the available documentation.

4. All evaluations, with a Summary Evaluation, were routed to each member (or alternate) in the PDCTG for independent review. This provided each member an opportunity to review the package for completeness and accuracy. Questions or comments raised during independent review were recorded on the Summary Evaluation (Fig. 7.5 of Attachment 1). A resolution was reached between the originator of the comment and the lead evaluator. The resolution was also documented on the Summary Evaluation forms.

5. A PDCTG meeting was held to discuss the results of the evaluation. The Lead Evaluator would present a summary of the detailed evaluation and a discussion of the resolution of comments. Additional comments could be raised at this time.

6. If all six members concurred on the evaluation, the evaluation was approved and documented by signature.

7. Each deficiency noted in the evaluation was included as an input to the process review by using Figure 7.1 of Procedure 1.04 "Review of the Plant Design Change Process". In addition, some process deficiencies were discovered in the detailed evaluation that did not result in a safety concern. These deficiencies were also factored into the process review using Figure 7.1 or Figure 7.2 as appropriate.

III. RESULTS

Detailed evaluations were completed on the 35 PDCRs listed in Table 1. Thirty-three (33) of the PDCRs were reviewed for "Impact on the Plant Design Basis", eleven (11) were reviewed for "Confirmation of Proper Implementation" and eighteen (18) were reviewed for "Provisions for Continued Safe Operation".

Eleven of the PDCRs reviewed resulted in no identified deficiencies. The remaining 24 PDCRs resulted in a total of 39 deficiencies requiring further evaluation or corrective action. Attachment 2 provides a summary for each of the 35 PDCRs. Each summary gives a brief description of the change, the area(s) evaluated, the conclusions of the evaluation and a listing of the identified deficiencies.

IV. CONCLUSIONS

The review of the PDCRs approved over the six year time frame has demonstrated that changes have been made with concern for both quality and safety. This is supported by the fact that deficiencies have been identified in only 24 PDCRs. This represents only 7% of the PDCRs reviewed in this project. In addition, in several instances, the identified deficiency is not related to the change itself, but related to the original design basis or components not changed by the PDCR. Some deficiencies have been identified through other programs already in place at NU such as the Integrated Safety Assessment Program. As such, some of the deficiencies identified by the CYPDCTG are not new or unknown within the NU organization.

Of the identified deficiencies, one was deemed significant enough to warrant immediate action. The deficiency was associated with PDCR 380 "RC Pump Component Cooling Water and Seal Water Return Isolation Modification". Charging system components may be used for the post LOCA recirculation mode. However, leakage from the charging system components is not accounted for in the Technical Specification or calculations. Since thyroid dose calculations show little margin to the 10CFR100 limits, the addition of leakage from the charging system components may be a serious problem. This concern was identified by the CYPDCTG to the Vice President of Nuclear and Environmental Engineering on July 2, 1983.

It is important to note that this deficiency was not caused by the PDCR itself. The use of charging pumps for post-LOCA recirculation is not directly related to

removal of RC pump support systems from containment isolation. However, the deficiency was identified through an extension of the review to include the entire containment isolation system.

Another contributing factor to the deficiencies identified with this PDCR, is that this change was one of a number of immediate changes required after the TMI accident. The requirement for immediate implementation and the heavy demand on manpower resources at the time, appear to have had an impact of the thoroughness of the review of the PDCR. Perhaps, too much reliance was placed on NRC guidance and generic reviews by the Owners Group.

While not identified as an immediate concern, two major areas have been identified that may require extensive evaluation and corrective action.

1. An evaluation is necessary to clearly identify the components and system boundaries necessary to allow cold shutdown following a design basis earthquake. The evaluation must consider protection of the required equipment from the impact of non-seismically qualified equipment, the primary and secondary system water requirements and the cooldown capability. An evaluation of the seismic qualification of the service water system is required.

2. An evaluation of the containment isolation system is required. A number of deficiencies have been identified with respect to the valves and piping in the isolation system. An integrated study of the isolation of the RC pump support systems is necessary to resolve the conflict in requirements for the availability of RC pumps and containment isolation.

The above discussion highlights the deficiencies that the CYPDCTG has deemed as most important. All deficiencies from the detailed evaluations are shown in Attachment 3. Process deficiencies have not been included in this table. The deficiencies have been collected into the following categories:

a. Design - questions about the adequacy of the design of a system or component.

b. Design/Seismic - questions about the seismic qualification of system or component. While a design area, this aspect has been singled out due to the number of occurrences.

c. Design/Safety Analysis - questions about the impact of the change on the design basis analysis and documentation.

d. Testing - questions about testing to confirm proper implementation of the change.

e. Procedural - questions about implementation of the change into Station Procedures to assure continued safe operation.

The results of the categorization are shown below:

Classification	Number of Deficiencies	Percentage of Total Deficiencies
Seismic	13	33%
Procedural	8	21%
Design	7	18%
Testing	5	13%
Safety Analysis	6	15%
	39	100%

The most common area of deficiency is in the engineering/design area and in particular seismic qualification of components. The three design categories, including seismic and safety analysis account for 66% of the deficiencies.

Attachment 3 also indicates deficiencies that had been identified through other programs currently in place in the NU organization, such as the Integrated Safety Assessment Program and the FDSA Chapter 10 Reanalysis Program. Eleven of the 39 deficiencies fall into this category. Thus, only 28 of the deficiencies may require the establishment of new projects or studies. Current programs related to the eleven other deficiencies should consider CYPDCTG findings because additional considerations have been developed in some cases.

TABLE 1

PDCRs REQUIRING DETAILED EVALUATION

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

ATTACHMENT 1

CONNECTICUT YANKEE

PLANT DESIGN CHANGE TASK GROUP

PROCEDURE 1.03

PLANT DESIGN CHANGE EVALUATIONS

SUBMITTED BY R. J. Schmidt
Chairman,
Plant Design Change Task Group

APPROVED
Vice President,
Nuclear and Environmental Engineering

REVISION 0.A

DATE 4 April 1985

CONNECTICUT YANKEE

PLANT DESIGN CHANGE TASK GROUP

PROCEDURE 1.03

PLANT DESIGN CHANGE EVALUATIONS

1.0 PURPOSE

This procedure describes the method used to examine in detail those plant design changes deemed to be important to ascertain if unanalyzed failure modes or more severe consequences were created (Reference 3.1).

2.0 APPLICABILITY

This procedure applies to the members of the Connecticut Yankee Plant Design Change Task Group (CY PDCTG) as designated by the Senior Vice President, Nuclear Engineering and Operations and to any alternate member assigned throughout the duration of the effort.

3.0 REFERENCES

3.1 Letter from W. G. Counsil to J. M. Taylor and Dr. T. E. Murley, "Haddam Neck Plant Response to Order Modifying License and Notice of Violation and Proposed Imposition of Civil Penalty (Inspection Report No. 50-213/84-23)," dated January 28, 1985.

3.2 CY PDCTG Procedure 1.02, "Plant Design Change Screening."

3.3 CY PDCTG Procedure 1.04, "Review of the Plant Design Change Process."

3.4 NEO Procedure 3.12, "Safety Evaluations."

4.0 DEFINITIONS

4.1 Lead Evaluator

Individual assigned to coordinate the review of a Plant Design Change.

4.2 Summary Evaluation

A brief summary stating the results of the review of the Plant Design Change.

4.3 Final Report

The report summarizing CY PDCTG activities to meet the requirements of Reference 3.1.

4.4 Scope Review

Initial review of a plant design change to determine the areas of concerns.

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 Approving selection of Alternate Evaluators.

5.2.2 Designating Lead Evaluators.

5.2.3 Transmitting recommendations on areas of concern to the Vice President, Nuclear and Environmental Engineering.

5.3 Lead Evaluator

Responsible for the following:

5.3.1 Writing the Summary Evaluation.

5.3.2 Coordinating the resolution of comments on the Summary Evaluation.

6.0 INSTRUCTIONS

6.1 General

6.1.1 The changes that shall receive a detailed review are determined in the screening as defined in Reference 3.2. These changes shall be evaluated based upon the guidance provided in this procedure.

6.1.2 If any CY PDCTG Member has been instrumental in the engineering, design or evaluation of the change, the member shall notify the CY PDCTG Chairman of the conflict. The member shall be replaced by an Alternate Evaluator. The steps for assigning an Alternate Evaluator are given in Section 6.6. The Alternate Evaluator shall be assigned prior to the Scope Review for the change.

6.1.3 Each change selected for detail review shall receive a Scope Review to determine the areas requiring a detailed review.

6.1.4 Based upon the areas of concern identified in the Scope Review, CY PDCTG Members shall be assigned to perform the detailed review. When adequate expertise does not exist on the PDCTG, NU discipline engineers or consultants will be used to provide specific information, on which the PDCTG may base its decisions. One of the members assigned to perform the review shall be designated, by the CY PDCTG Chairman, as Lead Evaluator.

6.1.5 The Lead Evaluator shall compile the individual evaluations into one package and write a summary evaluation.

6.1.6 The summary evaluation and supporting individual evaluations shall be reviewed by all CY PDCTG Members. Comments on the evaluation shall be documented.

6.1.7 The Lead Evaluator is responsible for coordination of the resolution of the comments. The resolution of the comments shall also be documented.

6.1.8 Upon resolution of the comments, the evaluation shall be discussed at a group meeting and approved by all CY PDCTG Members, including any Alternate Evaluators.

6.1.9 Upon approval of the evaluation, a list of deficiencies, for which expedient corrective action is recommended, shall be transmitted to the Vice President, Nuclear and Environmental Engineering.

6.1.10 The summary evaluations shall be documented so that they can be used as input to the evaluation of the design change process (Reference 3.3) or the final report.

6.1.11 All documentation for the detailed evaluation, including Figures 7.1 through 7.6 shall be filed with the design change package.

6.1.12 The CY PDCTG Chairman shall maintain an updated log of all design changes in the detailed evaluation process. The log shall list as a minimum, the design change number, Lead Evaluator, completion date, and whether or not there were deficiencies identified for further action.

6.2 Scope Review

6.2.1 The areas of consideration in the detailed review are divided into three phases. These are:

6.2.1.1 Impact on the Plant Design Basis.

6.2.1.2 Confirmation of Proper Implementation.

6.2.1.3 Provisions for Continued Safe Operation

A cross reference of the areas identified in Reference 3.1 and these three phases is given in Attachment 8.A. The Scope Review shall determine which phases require a detailed review. The basis for the determination shall be documented on Figure 7.1. Considerations generated for the detailed review during either the Screening Process (Reference 3.2) or the Scope Review shall be recorded on Figure 7.1.

6.2.2 Impact on the Plant Design Basis

The purpose of this phase of the detailed review is to determine if the plant design change performs its safety function, if any, and if the change may have created unanalyzed failure modes or more severe consequences. In addition, the review shall determine if the probability of any analyzed event has been increased. Some important areas to be considered in the review are listed in Attachment 8.B.

6.2.3 Confirmation of Proper Implementation

Since the design and evaluation of changes is based upon assumptions about the operation and the design margin, this phase reviews the testing and inspection programs to assure that the evaluation of the Impact on the Design Basis has been confirmed.

6.2.4 Provisions for Continued Safe Operation

If the design and evaluation of the change assumed operator actions including maintenance and surveillance, this phase reviews the procedures and training to assure that the evaluation on the Impact on the Design Basis remains valid.

8.0 ATTACHMENTS

8.A Categories of Detailed Review

8.B Considerations in Determining the Impact on the Design Basis

8.C Documentation for Review

Figure 7.1 Scope Review Form

PDC No. _____

Title: _____

I. Should the change be evaluated in detail for Impact on the Plant Design Basis?

_____
(Yes or No)

A. Basis and Considerations

B. Assigned Evaluators

II. Should the change be evaluated in detail for Confirmation of Proper Implementation?

_____
(Yes or No)

A. Basis and Considerations

B. Assigned Evaluators

III. Should the change be evaluated in detail for Provisions for Continued Safe Operation?

_____
(Yes or No)

A. Basis and Considerations

B. Assigned Evaluators

IV. Approval

G. E. Cornelius _____ Date _____

B. A. Tuthill _____ Date _____

D. G. Diedrick _____ Date _____

M. S. Kai _____ Date _____

R. A. Crandall _____ Date _____

R. J. Schmidt _____ Date _____

V. Lead Evaluator _____

Figure 7.2 Impact on Plant Design Basis

PDC No. _____

Title: _____

Evaluator: _____ Date: _____

I. Previously Evaluated Design Basis

A. Identify impact of change on systems necessary to protect a boundary

B. List applicable design basis for these systems

C. Determine if impact is already adequately addressed in the available documentation

D. Evaluate impacts not adequately addressed

E. List impacts requiring further evaluation or corrective action

II. Protective Boundaries

A. Identify any direct impact of change on protective boundaries:

1. Fuel/Cladding

2. RCS Pressure Boundary

3. Containment

4. Site Boundary (Offsite Doses)

B. Determine if the impact on the boundary is already adequately addressed in the available documentation

C. Evaluate the impact of the change on the safety margin for the boundary if not adequately addressed

D. List impacts requiring further evaluation or corrective action

III. Failure Modes

A. Determine credible failure modes of the change

B. Identify impact of failure modes on the protective boundary or systems necessary to protect the boundary. Secondary effects should be considered.

C. Determine if the failure modes have already been adequately addressed in the available documentation

D. Evaluate probability and impact of failure modes not adequately addressed

E. List failure modes requiring further evaluation or corrective action

IV. As-Built Design

A. For changes to systems necessary to protect a boundary, determine if the as-built design ensures the intent of the design change is met

B. List any areas where the design intent is not met

Figure 7.3 Confirmation of Proper Implementation

PDC No. _____

Title: _____

Evaluator: _____ Date: _____

I. List important parameters and assumptions that require confirmation

II. Determine if the testing and inspection programs for the change are adequate to confirm the important parameters and assumptions

III. List areas requiring further testing or inspection

Figure 7.4 Provisions for Continued Safe Operation

PDC No. _____

Title: _____

Evaluator: _____ Date: _____

I. Identify Operator actions assumed in the evaluation of the change

II. Determine if the procedures are adequate for specifying the operator actions

III. Determine if the maintenance and surveillance procedures for the change are adequate to ensure continued safe operation

IV. Determine if the training program is adequate for implementing the procedures

V. List areas requiring more training or procedure revision

Figure 7.5 Summary Evaluation

PDC No. _____

Title: _____

I. Summary of areas reviewed and conclusions

II. List of deficiencies requiring 1) further review/corrective action and 2) evaluation for the review of the plant design process (Reference 3.3)

III. Comments

1. Comment:

_____ _____
Originator Date

Resolution:

_____ _____ _____
Lead Evaluator Originator Date

2. Comment:

_____ _____
Originator Date

Resolution:

_____ _____ _____
Lead Evaluator Originator Date

3. Comment:

Originator _____ Date _____

Resolution:

Lead Evaluator _____ Originator _____ Date _____

IV. Approval

G. E. Cornelius _____ Date _____ R. A. Crandall _____ Date _____

B. A. Tuthill _____ Date _____ R. J. Schmidt _____ Date _____

M. S. Kai _____ Date _____ D. G. Diedrick _____ Date _____

Figure 7.6 Qualifications of Alternate Evaluators

PDC No. _____

Title: _____

I. State the name of the CY PDCTG Member being replaced and the reason for the replacement.

II. Describe the qualifications of the proposed alternate reviewer.

A. Name: _____

B. Qualifications:

C. Recommended by: _____
(CY PDCTG Member)

III. Training of Alternate Evaluator

I have read and understand the CY PDCTG Procedures.

_____
Alternate Reviewer Date

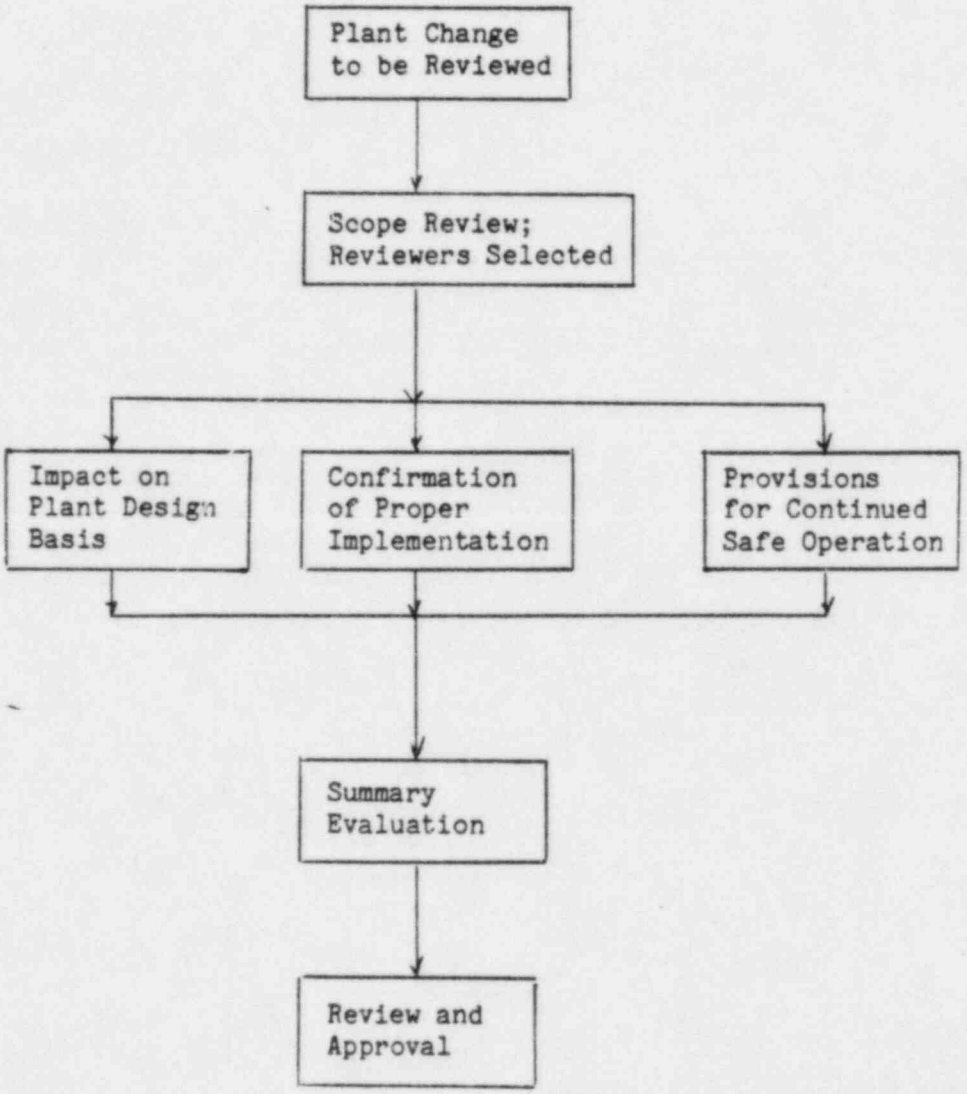
IV. Approval

The proposed alternate reviewer is acceptable and the above actions are complete.

_____
CY PDCTG Chairman Date

Figure 7.7

Flow Chart



Attachment 8.A Categories of Detailed Review

Impact on Design Basis:	Engineering/Design Construction
Confirmation of Proper Implementation:	Inspection Pre-Operational Testing Turnover Construction
Provisions for Continued Operation Operation:	Training Procedures

Attachment 8.B Considerations in Determining the Impact on the Design Basis

Environmental Qualification

Jet Impingement and Pipe Whip

Single Failure Criterion

Abnormal and Emergency Operation

Seismic Response

Fire Protection

Flooding

Missiles

Diesel Generator Loads

Separation

Common Mode Failures

System Interactions

Plant Security

Human Factors

Heavy Loads

Attachment 8.C Documentation for Review

Engineering/Design:	Piping and Instrumentation Drawings Stress Isometrics Design Calculations Piping/Cabling Drawings Installation Specification Purchase Orders and Specification FDSA and other docketed analyses SEP PDCR evaluations PA evaluations PORC minutes NRB minutes NRC Safety Evaluations Technical Specifications Bases
Construction:	Welding Qualification Vendor Certification Installation Procedure DCN/DCR Field Change Notices
Inspection:	Non Conformance Reports
Pre-Operational Testing:	Test Reports
Turnover:	Summaries of Discrepancies and Tests
Procedure:	NOPs AOPs EOPs System OP's Maintenance Procedures Surveillance Procedures
Training:	Training Records Lessons Plans

ATTACHMENT 2

SUMMARIES OF DETAILED EVALUATIONS OF PDCRs

PDCR No. 290

TITLE Rerouting of Charging Pump P-18-13
4160 v Power Supply Cable

Scope of PDCR

Diversified the charging pump power cabling routings by running the B charging pump cable outside the PAB.

Scope of Evaluation

To determine if the cabling was seismically supported and protected from tornado missiles.

Conclusions of Evaluations

The re-routed cabling is seismically supported but is not protected from tornado missiles. The power cable to the A charging pump is protected from tornado missiles. Common switchgear failure due to tornado missiles is being addressed via integrated assessment/ISAP.

Deficiencies and Corrective Actions

None.

PDCR No. 294

TITLE RHR Purification Flow Control Valve Reach Rod

Scope of PDCR

A reach rod assembly was installed on manual valve RH-V-874A.

Scope of Evaluation

Degradation of seismic qualification of the piping was a concern. This valve serves as the RCS pressure boundary during recirculation cooldown following a LOCA or feed and bleed event.

Conclusions of Evaluations

Piping is not seismically qualified and must be upgraded. This task has already been identified in the Integrated Safety Assessment Program (ISAP).

Deficiencies and Corrective Actions

Piping is not seismically qualified.

System piping may perform numerous functions. These should be determined prior to implementation of a change such that any required function is not impeded. This concern is addressed in the review of the design change process.

PDCR No. 300

TITLE Diesel Sequencing Timers

Scope of PDCR

The sequencing timers on the Diesels for starting the service water pumps and CAR fans were replaced with Agastat timers.

Scope of Evaluation

The following areas were reviewed for this PDCR:

1. Coil voltage and contact rating for the new timers.
2. Environmental and seismic qualification for the timers.
3. Surveillance testing of the timers.

Conclusions of Evaluations

1. The contact rating and coil voltage were found to be suitable for its application.
2. The timers are environmentally and seismically qualified; however, no specific information on the mounting of the timers was found. A seismic evaluation of the mounting of the timers is required.
3. The surveillance procedures were reviewed and found to be adequate. The Agastat timers have performed adequately in the testing. A change in the frequency of testing is not warranted.

Deficiencies and Corrective Actions

1. Seismic evaluation of the mounting of the sequencing timers. This should be expanded to include all of the sequencing timers.

PDCR No. 306

TITLE Containment Fan Filter Timers

Scope of PDCR

Installed timers on the main control board to monitor the time the face dampers are open to the containment air recirculation system charcoal filters.

Scope of Evaluation

1. Reviewed the seismic aspects of mounting the timers on the main control board.
2. Reviewed the procedures for the use and surveillance of the timers.

Conclusions of Evaluations

1. Seismic design is acceptable - no negative effect on main control board.
2. Procedures for use of the timers are adequate, however no procedures exist to ensure they continue to function properly.

Deficiencies and Corrective Actions

1. Procedures are required to ensure the continued proper functioning of the timers.

PDCR No. 314

TITLE Vital Area Protection of Control Room

Scope of PDCR

Provide necessary modifications to the control room, visitors gallery, and reactor engineers office to meet the security requirements of 10CFR73.55.

Scope of Evaluation

The evaluation was conducted on determining the extent of the fire protection and security changes, and their potential secondary effects on the control room.

Conclusions of Evaluations

Available documentation is limited but no impacts were identified on the operation of the plant. The security portions of the change are remote to operational equipment. The ventilation changes were internal within the control room and did not change the fire protection or habitability aspects of the room.

Deficiencies and Corrective Actions

None.

PDCR No. 326

TITLE Fire Suppression System Additions and Modifications

Scope of PDCR

This PDCR modified the fire suppression system to implement SEP and other commitments for upgrades. Included in the PDCR are the following:

1. Install sprinkler systems in Fire Zones A-1A, A-1B, A-1C, A-6, P-1, P-3, S-9, S-10, S-11, S-12, S-13, S-14, S-15, S-16, S-18, S-19, S-20, S-21, S-23, T-1 and T-2.
2. Install automatic fire suppression systems in Fire Zones D-1, D-2 & S-17.
3. Install a backup CO_2 suppression system for Fire Zone R-1.
4. Install an automatic local application Halon suppression system for MCC-5, 480V switch-gear panel, D.C. distribution panel and vital bus power supply cabinets in fire zone S-8.
5. Install hose stations in Fire Zones A-1B, A-11, P-1 and S-8.
6. Relocate supply line for sprinklers in T-1A from alternative source.
7. Relocate hose station shutoff valves outside Fire Zone S-17.
8. Modify support system for hose station header in Fire Zone S-17.
9. Install inter-connection to hose station ring header from independent supply in Fire Zone S-26.
10. Install independent feed to yard fire loop from fire pumps in P-1.
11. Install an additional sectionalizing valve in yard fire loop.

Scope of Evaluation

The following areas were investigated in the detailed review:

1. Seismic qualification of the fire suppression systems located directly above safety related equipment.
2. Impact of fire suppression fluids sprayed onto safety related equipment.
3. Design of ventilation isolation upon actuation of CO_2 or Halon release.

Conclusions of Evaluations

1. Seismic qualification of fire suppression systems was not addressed. A study is required to assess the seismic qualification of the fire suppression systems.

2. The impact of fire suppression fluids sprayed onto safety related equipment was not addressed. Specifically, the adequacy of the cable tray supports to withstand water loads from the sprinklers was identified as a concern. A study is required to assess the impact of the fluids on safety related equipment.
3. The ventilation design ensures isolation upon fire detection to allow effective use of CO_2 and Halon systems.

Deficiencies and Corrective Actions

1. Seismic qualification of the fire suppression systems located above safety related equipment.
2. Evaluation of impact of fire suppression fluids sprayed onto safety related equipment.

PDCR No. 332

TITLE Auxiliary Feed Pump Bearing
Oil Cooling System

Scope of PDCR

A self-contained auxiliary feedpump cooling water system, which will circulate a portion of the first stage pump discharge flow to all necessary pump turbine bearings, was added to replace service water cooling.

Scope of Evaluation

Two failure modes of the auxiliary feed pump bearing oil cooling system that may result in overheating the bearings, were investigated. These are:

1. High temperature water circulated to the pump turbine bearings.
2. Seismic failure of the auxiliary feed pump bearing oil cooling system.

Conclusions of Evaluations

1. Monitoring of AFW temperature assures that the seals and bearings will not overheat due to an increase in temperature of the circulating water.
2. The auxiliary feed pump bearing oil cooling system is seismically qualified.

Deficiencies and Corrective Actions

None.

PDCR No. 333

TITLE Combustible Gas Detection System

Scope of PDCR

Installed a number of combustible gas detectors in the Chem Lab and other locations, with readout and alarm in the control room.

Scope of Evaluation

Evaluated the adequacy of the system design, pre-operational testing and calibration of the system and the procedures for use and maintenance of the system.

Conclusions of Evaluations

1. System is adequately designed and will perform its intended function.
2. Preoperational testing and initial calibrations were adequate.
3. Procedures and responsibilities for continued maintenance and calibration were not developed due to inadequate turnover.

Deficiencies and Corrective Actions

Procedures and responsibilities were not established for the continued maintenance and calibration of the system.

PDCR No. 344

TITLE Containment Isolation Reset Mod

Scope of PDCR

The change intended to prevent components which are actuated by containment isolation from automatically returning to their preactuated state upon reset of trip relays.

Scope of Evaluation

The evaluation included design, testing, implementation, and completeness.

Conclusions of Evaluations

A modification to the approved design was made without review and approval, and the modification did not get incorporated into design records.

Initial design did not include or consider all of the components which are actuated by the containment isolation signal and pre-operational testing did not identify the oversights. These have been included in the design process review.

Deficiencies and Corrective Actions

The system design oversights have been identified to the NRC and commitments have been made to correct the oversights prior to start-up after the 1986 refueling.

Revise ANN4.4-12A&B, EOP3.1-4, EOP3.1-5 and operator training lesson plan to clearly specify the steps necessary to clear the SI/HCP block and identify the possibility of inadvertent block due to alignment of the 12 valves.

PDCR No. 347

TITLE Reactor Coolant System Venting System

Scope of PDCR

Installed piping and valves on reactor vessel head and pressurizer to allow remote-manual venting of Post-LOCA non-condensible gases to the car fan region.

Scope of Evaluation

Evaluated the consequences of venting H_2 into the containment. Evaluated valve capabilities including leak tightness, ability to operate against full differential pressure ability to pass water, position indication and EEQ. Evaluated the valve operability testing which was performed. Reviewed the training and procedures for use of the head vent and the surveillance procedures for ensuring continued operability.

Conclusions of Evaluations

H_2 venting is not a concern. Valve design and testing is adequate except for ensuring that they are capable of passing water and that they will open and close against full differential pressure. Operating and surveillance procedures are adequate except for the need to update the AOP to incorporate updated calculations on venting times and to evaluate the need to test for actual valve plug movement during operability surveillance.

Deficiencies and Corrective Actions

1. The capability of the valves to pass water must be evaluated.
2. Ability of the valves to open and close against full Differential Pressure must be confirmed.
3. AOP 3.2-22 should be updated to include new calculations on venting times.
4. Need to test valve operability by checking actual valve plug movement during surveillance testing should be determined.

1. The current dose analysis and Technical Specifications do not address the contribution to the offsite dose by charging system outleakage. Because the analyzed thyroid dose is near the 10CFR100 limit, NU management was promptly informed of this concern for corrective action. A copy of that correspondence, which also provides greater detail, is attached.

2. The advisability of this modification should be further evaluated, perhaps using PRA methods. This study should weigh the benefit of RCP operability for some accidents against the reduced containment integrity for design basis accidents.

3. Plant procedures should be modified to require prompt manual closure of these valves if the RCPs are not running, with the possible exception of the thermal barrier isolation valve.

4. If the isolation valves are to remain non-automatic after 2) is complete, evaluate the need to seismically upgrade associated piping and resolve the dose concerns in the PAB, for the DBA condition.

5. Modify the high flow logic to FCV-608 so that it stays closed after the initial high flow signal.

6. Under certain conditions, contaminated RCS water will be released from containment via the seal water return line and relief valve CH-RV-332. These conditions are:

   a. LOCA with RCS pressure greater than 140 PSIG, and
   b. No operator action to close CH-MOV-311, 312, 313, and 314, despite alarms from VCT parameters, and
   c. Charging system not in service, or closure of CH-TV-334 when the charging system is in the recirculation mode. (NOTE: CH-TV-334 fails closed on loss of air).

7. Evaluate the findings of the CYPDCTG report "Containment Piping Penetrations - June 1985", and resolve all concerns.

PDCR No. 368

TITLE Reactor Coolant Pump Seal Water Supply Valves

Scope of PDCR

Replaced the RCP seal water supply line isolation valves with a new valve type and added reach rods.

Scope of Evaluation

Evaluated the impact of the change on the system stress analysis.

Conclusions of Evaluations

The change did not degrade the current system design requirements in regard to stress analysis. However, seismic requirements are not part of the current design basis for the seal water system.

Deficiencies and Corrective Actions

Perform an evaluation to determine the seismic design requirements for the entire RCP seal water system.

PDCR No. 371

TITLE TMI 2.1.8 - Additional Equipment to Follow Course of Accidents

Scope of PDCR

Change involved the installation of containment wide range pressure indicators, wide range water level indicators and hydrogen analyzers. The hydrogen analyzers have yet to be installed.

Scope of Evaluation

Evaluated the testing and surveillance of the installed monitors to ensure continued accuracy.

Evaluated the operator procedures and training to ensure proper use of the monitor readings.

Conclusions of Evaluations

Testing and surveillance are adequate to ensure continued accuracy.

Procedures have been developed for the use of the containment wide range water level indicators. However, such procedures are inconsistent with design calculations (e.g., volume of water trapped and unavailable to containment sump) and are not written with human factors considerations (i.e., are subject to misinterpretation).

Deficiencies and Corrective Actions

Resolve inconsistencies between procedures and calculations on containment water level and evaluate recommendations of procedure improvements.

PDCR No. 380

TITLE RCP Component Cooling Water and Seal Water Return Isolation Modification

Scope of PDCR

This PDCR removes seven containment isolation valves from the containment isolation actuation signal. The seven valves are: a) component cooling water (CCW) from the RCP thermal barrier, b) CCW from the RCP oil coolers and; c) five valves from the seal water return.

Scope of Evaluation

The evaluation addressed the overall adequacy of the change, including a review of the implementation process. The evaluation also addressed the adequacy of containment penetration local leak rate testing and penetration design. A specific concern for evaluation was the impact of this change on offsite dose.

Conclusions of Evaluations

As indicated by the deficiencies below, a more thorough review of this PDCR should have been performed. This change was implemented in response to the TMI-2 Short-Term Lessons-Learned, and a letter from the NRC stated acceptance of the change. The apparent lack of thoroughness may have been caused by the high workload of the time and/or regulatory pressure to implement the change. It appears that the focus of the review was on RCP operability, and that containment integrity aspects were not adequately considered.

Deficiencies and Corrective Actions

The following deficiencies and corrective actions/recommendations were identified as a result of the evaluation of this PDCR:

1. The current dose analysis and Technical Specifications do not address the contribution to the offsite dose by charging system outleakage. Because the analyzed thyroid dose is near the 10CFR100 limit, NU management was promptly informed of this concern for corrective action. A copy of that correspondence, which also provides greater detail, is attached.

2. The advisability of this modification should be further evaluated, perhaps using PRA methods. This study should weigh the benefit of RCP operability for some accidents against the reduced containment integrity for design basis accidents.

3. Plant procedures should be modified to require prompt manual closure of these valves if the RCPs are not running, with the possible exception of the thermal barrier isolation valve.

4. If the isolation valves are to remain non-automatic after 2) is complete, evaluate the need to seismically upgrade associated piping and resolve the dose concerns in the PAB, for the DBA condition.

5. Modify the high flow logic to FCV-608 so that it stays closed after the initial high flow signal.

6. Under certain conditions, contaminated RCS water will be released from containment via the seal water return line and relief valve CH-RV-332. These conditions are:

   a. LOCA with RCS pressure greater than 140 PSIG, and
   b. No operator action to close CH-MOV-311, 312, 313, and 314, despite alarms from VCT parameters, and
   c. Charging system not in service, or closure of CH-TV-334 when the charging system is in the recirculation mode. (NOTE: CH-TV-334 fails closed on loss of air).

7. Evaluate the findings of the CYPDCTG report "Containment Piping Penetrations - June 1985", and resolve all concerns.

Deficiency Number	PDCR No. and Title	Deficiency	Category	
21	384/401 Automatic Initiation of Aux. Feedwater	Questionable Design Basis Analysis of the AFW system.	Safety Analysis	*
22	388 Primary Vent Stack Ring	Evaluate the means of accomplishing cold reactor shutdown following a seismic event utilizing only seismically qualified and protected equipment.	Seismic	*
23	418 PORV and Block Valve Logic Mod.	Failure to seismically qualify relays and mounting.	Seismic	
24	436 Upgrade of Spent Fuel Building North Crane CR5-1A	Upgrade both fuel handling cranes equipment and QA classifications and refueling manipulator to QA Category I.	Seismic	*
25	443 Flood Protection Modifications	Failure to test or verify adequacy of cooling of service water pumps with flood protective covers in place.	Testing	
26	459 Re-evaluation of Safety Related Piping	Re-evaluate scope of project to ensure safe reactor shutdown to cold conditions following a seismic event.	Seismic	*
27	486 Terry Turbine Steam Control	Inadequate consideration of operability with loss of control air.	Design	
28		Incomplete consideration of error analysis in verifying the capacity of the system.	Testing	
29	592 Charging Pump	Failure to assess impact of change of pump curve on DBA.	Safety Analysis	

NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

July 2, 1985

CY PDCTG-093

MEMO

TO: C. F. Sears

FROM: R. J. Schmidt, Chairman, CY PDCTG

SUBJECT: Connecticut Yankee Plant Design Change Task Group (CY PDCTG)
Notification of Safety Concern - CY PDCR #380

This memo informs you of a CY PDCTG concern that warrants your timely action. Although not an immediate safety concern, our finding is potentially significant from a licensing and safety analysis standpoint.

This concern was recognized during our detailed evaluation of PDCR 380, RCP Component Cooling Water and Seal Water Return Isolation Modification. This PDCR removed seven containment isolation valves from automatic actuation, to permit RCP operation after a LOCA.

The condition of our concern, however, existed before PDCR 380 was initiated. We found that the off-site dose analysis does not consider a release pathway via charging system out-leakage. The charging system is used during the recirculation mode to provide the necessary pump head during a SBLOCA, and for mitigating boron precipitation. In either case, the charging system takes suction from the RHR system. The out-leakage from the RHR system is considered in the dose analysis and limited by Tech. Specs. The charging system out-leakage, however, is neither considered in the analysis nor Tech. Specs. Out-leakage was evaluated by TMI-2 Short-Term Lessons Learned Item 2.1.6.A, but its impact on the off-site dose was not assessed. Because the thyroid dose is calculated to be very close to the 10CFR100 limit, any additional release requires timely evaluation.

PDCR 380 does have relevance to this concern, as the desire and capability to maintain RCP seal water flow places another requirement for charging system operation post-LOCA, and also adds the seal water lines as an additional out-leakage path.

The CY PDCTG has additional information regarding these concerns. We are available to provide this information per your request.

cc: CY PDCTG Members
J. F. Opeka
E. J. Mroczka
R. H. Graves
G. D. Baston
G. R. Pitman
D. E. Vandenburgh - YAEC
C. H. Poindexter - BG&E
W. D. Harrington - BECo
R. T. Laudenat/R. M. Kacich

OS70 REV. 3-83

PDCR Nos. 384 and 401

TITLE Automatic Initiation of Auxiliary Feedwater

Scope of PDCR

PDCR 384 - an automatic initiation system was added for AFW. The system will initiate AFW upon: a) opening of both MFW pump breakers or, b) coincident low level in two SG - based on wide range level. The automatic initiation system will perform the following actions: a) partially open the terry turbine steam admission valves and, b) fully open the feedwater bypass valves. PDCR 401 upgraded the level instrumentation from control grade to safety grade.

Scope of Evaluation

The detailed evaluation addressed the following areas:

1. AFW system design criteria and the design basis analysis that supports the AFW system under automatic initiation.
2. The surveillance procedures associated with automatic initiation.

Conclusions of Evaluations

1. Since the submittal of the design basis analysis to the NRC, a number of problems have been identified with the analysis. For some problems new calculations have been performed while for others, new calculations have been planned. Areas requiring re-evaluation include the following:

   a. Reassessment of PORV criteria for LOFW.
   b. Limiting single failure for LOFW.
   c. Design basis SLB to include additional sensitivity studies.

   Upon completion of the re-evaluation, the need for an updated submittal to the NRC should be assessed.

2. The surveillance procedures were found to be adequate.

Deficiencies and Corrective Actions

Re-evaluation of the AFW design basis analysis and associated criteria.

NOTE: Some aspects of the AFW system are addressed in the detailed evaluation of other PDCRs.

PDCR 486, "Replacement of Terry Turbine Steam Control Valves".
PDCR 634, "Replacement of Foxboro Pressure Transmitters".

PDCR No. 388

TITLE Primary Vent Stack Spray Ring

Scope of PDCR

A spray ring was added to allow decontamination of the inside of the stack following a gaseous release.

Scope of Evaluation

Determine if the stack is seismically qualified and if not, what impacts occur post seismic event. Same concerns were extended to the yard crane and the work platform/stairs on the containment.

Conclusions of Evaluations

The plant stack and work platform/stairs are not seismically qualified. Thus, integrity of RWST, DWST, terry turbines, etc., cannot be assured post seismic event. The RWST is required for a cold reactor shutdown following a seismic event. Also, insufficient inventory exists in the DWST to permit a cold reactor shutdown due to inadequate vent paths from the secondary side of the steam generators.

Deficiencies and Corrective Actions

Provide the means for accomplishing a cold reactor shutdown following a seismic event utilizing only seismically qualified and protected components. The yard crane's seismic capability must be determined.

PDCR No. 397

TITLE PAM Aux. Main Control Board

Scope of PDCR

Added additional control board space in the form of auxiliary cabinets. Included the installation of additional electrical raceways for instrument wiring and relocated radio and computer equipment to a more remote section of the control room.

Scope of Evaluation

The evaluation determined the extent of the changes and the adequacy of conducting the changes. The completion of several PDCR's were included in this as part of the completion and calibration of the control board modification.

Conclusions of Evaluations

The installation of the control boards, raceways, instrumentation, and relocation of auxiliary equipment was completed in a safe and documented manner. The addition of certain portion of other PDCRs to the scope of this PDCR was not according to procedure but was done with proper documentation and testing.

Deficiencies and Corrective Actions

None.

PDCR No. 406

TITLE Building Modification Project

Scope of PDCR

The change involved the demolition of select walls, flooring, and plumbing of the service building and new construction in the service building, old diesel generator building and drum storage building.

Scope of Evaluation

The evaluation was conducted to verify that there was no potential secondary effects due to seismic events, flooding, or fire that could result from these changes.

The location of changes in relation to Category 1 equipment was evaluated. Only the cable spreading area was determined to be a potential concern. A walkdown of the cable spreading area was performed.

Conclusions of Evaluations

No potential seismic or fire effects were noted during the walkdown.

No flooding concerns due to this PDCR were noted.

The potential of water loading (excessive) of cable trays due to the fire protection sprinklers added per PDCR 326 was noted in the site inspection. Activation of the sprinkler system could flood the cable trays and possibly overload them since drainage is very limited because of the tight packing of wire in the trays.

Deficiencies and Corrective Actions

None - potential overloading of cable trays was identified and corrective action recommended in PDCR 326.

PDCR No. 418

TITLE PORV and Block Valve Logic Mod

Scope of PDCR

Modified and added relays to allow change in logic for automatically opening the pressurizer PORV's and block valves. Logic went from a single high pressure signal to a coincident two out of three signal.

Scope of Evaluation

Evaluation was limited to a review of the seismic design of mounting of the new relays on the main control board and of the relays themselves.

Conclusions of Evaluations

Seismic qualification of the relays and their mounting on the main control board is questionable.

Deficiencies and Corrective Actions

Seismically qualify the relays and their mounting on the main control board.

PDCR No. 436

TITLE Upgrade of Spent Fuel Building
North Crane (CR5-1A)

Scope of PDCR

North Spent Fuel Building Crane was upgraded from 3 ton capacity to 5 tons to permit installation of new spent fuel racks.

Scope of Evaluation

Determine the consequences of a fuel handling accident and relate this finding to the QA classification of the crane.

Conclusions of Evaluations

Based upon the design basis accident for both fuel handling cranes and the containment refueling manipulator, each crane must be upgraded to QA category I.

Deficiencies and Corrective Actions

Based upon the design basis accident for both fuel handling cranes and the containment refueling manipulator, each crane must be upgraded to QA category I.

The upgrade was not performed because the SEP results were not known to constitute the design basis. The CY design basis as modified by regulatory issues such as SEP must be identified. This includes the impact of NRC requested evaluations, studies, etc. This information is necessary such that associated component QA classifications can be revised. This concern is addressed in the process review.

PDCR No. 443

TITLE Flood Protection Mods

Scope of PDCR

This modification provided flood protection to a stillwater elevation of 30 feet MSL as required by the NRC.

Scope of Evaluation

The evaluation was conducted to ascertain that the plant can maintain a safe shutdown condition during maximum flood conditions.

Conclusions of Evaluations

All aspects of flooding were adequately considered. Limited flooding is taken into consideration and is allowed. Protection of the service water pumps has been provided, however the adequacy of cooling with the protective covers in place has never been verified.

Deficiencies and Corrective Actions

Service water pump cooling with protective covers in place needs to be addressed. Testing or calculation should be conducted.

PDCR No. 459

TITLE Re-evaluation of Safety Related Piping

Scope of PDCR

Upgrade piping supports as required by SEP topic III-6. This topic requires that safety related systems be evaluated and modified if necessary to ensure their integrity and continued operation when subjected to a postulated Safe Shutdown Earthquake (SSE).

Scope of Evaluation

Determine work scope of PDCR.

Determine if scope of work included all necessary systems.

Conclusions of Evaluations

A relatively small portion of the work scope defined in the project instruction has been completed to date. Since only pipe supports, not piping has been modified, secondary effects are minimal. Full scope of project must be evaluated in light of PDCRs 388 and 660 to ensure a safe reactor shutdown to cold conditions following a seismic event.

Deficiencies and Corrective Actions

Scope of project must be reviewed to ensure all necessary systems are upgraded to ensure safe reactor shutdown to cold conditions following a seismic event (see PDCRs 388 and 660).

PDCR No. 460

TITLE Head Area Cable Support Structure (HACSS)

Scope of PDCR

This PDCR upgraded the HACSS, and included modifications to the missile shield to meet seismic requirements. The modification also upgraded cable connectors and provided new cabling for the core exit thermocouples and heated junction thermocouples.

Scope of Evaluation

This PDCR was selected for detailed evaluation because of the importance of its structural adequacy, due to its location above the reactor. Unlike most evaluations, it did not focus on specific problems identified in the screening review. A general review of the project was performed to assess its quality.

Conclusions of Evaluations

The evaluation found that a competent job was done and a quality product produced. The work appeared to be controlled and orderly, with appropriate involvement of project participants and the plant. The seismic upgrade of the missile shield was reviewed and found to be adequately performed.

Deficiencies and Corrective Actions

No deficiencies were identified for corrective action.

PDCR No. 461

TITLE Reactor Cavity Pool Seal and Neutron Streaming Shield

Scope of PDCR

Change involved the installation of:

1. Reactor cavity pool seal - including new lifting rig.
2. Pool seal storage structure.
3. Neutron streaming shield.

Scope of Evaluation

Evaluated the design aspect of the pool seal lifting rig and storage structure and the neutron streaming shield. The design of the pool seal was not evaluated as it was subsequently replaced after failure via another PDCR.

For the neutron streaming shield, the following were evaluated: seismic design of shield and support brackets, hydrogen generation, performance capability, reactor cavity temperature effects, missile generation and cavity pressurization.

Conclusions of Evaluations

Changes are acceptable from a safety aspect. Some design process weaknesses were identified during the review.

Deficiencies and Corrective Actions

None.

PDCR No. 486

TITLE Terry Turbine Steam Control Valves

Scope of PDCR

The steam inlet pressure control valves for the terry turbines for the AFW pumps were replaced by Masoneilan Camflex II valves.

Scope of Evaluation

In the detailed evaluation of this PDCR, the following areas were addressed:

1. The impact of the change in valves on the design basis analysis for the AFW system.
2. The impact of the change on the sizing of the relief valves for the terry turbine.
3. The adequacy of the valves to provide AFW at low SG pressure.
4. The adequacy of the surveillance and maintenance procedures for the valves.

Conclusions of Evaluations

1. The hand controllers for the automatic initiation system have been readjusted for the new valves. Thus, the design basis analysis is still valid.
2. The capacity of the relief valves is adequate to assure overpressure protection.
3. Normal cool down uses AFW and confirms the adequacy of AFW flow at low pressure.
4. In reviewing the failure modes for the valves, it appears that automatic initiation with loss of control air (non safety grade system) may overspeed the turbines and result in a turbine trip and subsequent loss of AFW. A seismic event is a possible initiator for loss of FW and loss of control air. An evaluation of this possible common made failure is required.

5. No specific maintenance procedure has been developed for this valve. Maintenance is performed based upon the workorder and the vendor manual is used for guidance. This is accepted plant practice.
6. The surveillance procedure for adequate AFW capacity does not appear to take into account measurement uncertainty.

Deficiencies and Corrective Action

1. An evaluation of the automatic initiation system with loss of control air is required. A seismic event is a possible source of loss of FW and loss of control air. Can credit be taken for control air (a non safety related system) for proper functioning of the automatic initiation system?
2. An error analysis is required for the verification of AFW capacity. The results of the error analysis should be factored into either the test criteria or the design basis analysis.

PDCR No. 513

TITLE Boric Acid Line Relocation

Scope of PDCR

The boric acid piping to the charging pump suction from the boric acid batching tank was re-routed from in front of the waste gas building door.

Scope of Evaluation

Determine if the line is seismically qualified and determine if the system hydraulic characteristics were impacted by the change.

Conclusions of Evaluations

The requirement for using the boric acid batching tank for a safe shutdown following a seismic event will be identified per PDCR 388. Piping will be seismically qualified as this analysis dictates.

System hydraulic requirements were not adversely impacted.

Deficiencies and Corrective Actions

The lack of quantification of the hydraulic requirements in the PDCR package shows a failure to support design assumptions with appropriate details. This concern is addressed in the process review.

PDCR No. 592

TITLE Charging Pump Modifications

Scope of PDCR

This change included replacing the rotating assembly of the "A" charging pump with one identical to the assembly in the "B" Pump, replacing the gear driven main lube oil pump with an electric driven pump, swapping the power feeds for the aux. lube oil pumps to align them with the proper electrical division, and replacing the stainless steel clad carbon steel casing with a stainless steel casing.

Scope of Evaluation

Evaluated was the change in casing material, degraded voltage performance of the main lube oil pump motors, and the pump flow curve changes as it affects design basis analyses. The thoroughness of the change was reviewed and steps taken to assure the quality of the change were checked.

Conclusion of Evaluations

The change involved a variety of separate parts. Shortcomings were noted in several of the parts of this change.

Deficiencies and Corrective Actions

1. The impact of the change in the pump curve on design basis analyses must be determined.
2. When the PDCR was implemented no evaluation of the suitability of the new casing material was documented. This concern is addressed in the process review.
3. The acceptability of charging pump main lube oil pump motor performance under degraded voltage conditions must be established.
4. Several procedures did not reflect the changes for this PDCR.

PDCR No. 604

TITLE Waste Gas/H_2-N_2 Supply

Scope of PDCR

This change added a short piece of 3/8 tubing and several small valves to permit recycling of waste gas during periods of high reactor coolant pump seal leakage when hydrogen consumption is high and processing of high volumes of hydrogen through the waste gas system occurs.

Scope of Evaluation

The change was reviewed to determine if an additional fire hazard had been created by the change.

Conclusions of Evaluations

The change was reviewed by the Generation Fire Protection group which determined that the change did not create a significant fire hazard.

Deficiencies and Corrective Actions

None.

PDCR No. 626

TITLE Replacement of Foxboro Feedwater Flow Transmitters

Scope of PDCR

This modification replaced the four feedwater flow transmitters that are used for input to the plant calorimetric calculation.

Scope of Evaluation

This evaluation reviewed the quality classification design requirements testing, and operating condition of the flow transmitters, also and addressed the associated flow elements and related instrumentation.

Conclusions of Evaluations

It was concluded that this PDCR enhances plant safety. However, a broader review found that improvements in the flow measurement system and associated reactor trip inputs should be made.

Deficiencies and Corrective Actions

1. The uncertainty of the flow measurement system should be established and corrected, if necessary. This includes the present efforts to procure and test new flow elements.
2. The seismic adequacy of the Hagan flow transmitters, which supply a reactor trip function, and associated sensing lines, should be established and corrected, if necessary.

PDCR No. 634

TITLE Replacement of Foxboro Pressure Transmitters PT403 and PT404

Scope of PDCR

Replacement of Foxboro Pressure Transmitters PT403 and PT404 with Foxboro pressure transmitters qualified to IEEE 323-1974 and IEEE 344-1975.

Scope of Evaluation

Two areas were reviewed in detailed evaluation:

1. Seismic qualification of instrument tubing; expanded to include SG level, pressurizer level, pressurizer pressure as well as RCS pressure.
2. Adequacy of procedures to provide guidance for a SBLOCA that results in a loss of RCS pressure indication.

Conclusions of Evaluations

1. Seismic qualification of SG and pressurizer tubing should be included in ISAP and seismic qualification of RCS pressure instrument tubing should be performed along with charging system upgrade in 1986.
2. Based upon input from CY operations, it was concluded that no changes to the EOPs are warranted.

Deficiencies and Corrective Actions

1. Seismic qualification of instrument tubing.
2. Clarification of Reg. Guide 1.97 submittal.

PDCR No. 652

TITLE S. G. Primary Manway Cover Multiple Stud Tensioner and Handling Device

Scope of PDCR

This change is intended to provide an alternate method of closure (studs vs. bolts) of the Steam Generator manway covers and a modification of the platforms and equipment support mechanisms.

Scope of Evaluation

The evaluation was conducted to assure adequate procedural control of stud tensioning.

Conclusions of Evaluations

Both procedural and mechanical (design) controls are adequate to preclude over extension of studs used on the S/G manway covers.

Deficiencies and Corrective Actions

None.

PDCR No. 653

TITLE Vital Inverter Cabinet Ventilation

Scope of PDCR

The vital inverters were improved by the addition of cooling fans to ventilate the cabinets. Seismic support of conduit was provided and components were relocated within the cabinets to permit better air flow.

Scope of Evaluation

This evaluation was specifically concerned with the seismic aspects of the vital inverters. A review of the project was performed as part of the design change process review.

Conclusions of Evaluations

Although the structure of the cabinets was analyzed, the analysis did not consider the relocation of components internal to the cabinet.

Deficiencies and Corrective Actions

A seismic analysis of the vital inverter cabinets is planned by Generation Mechanical Engineering, to include actual component locations. Corrective action, if necessary will be determined upon the completion of this analysis.

PDCR No. 660

TITLE Relief Valve for Spent Fuel Pool Heat Exchanger

Scope of PDCR

A relief valve on the service water side of the 'A' spent fuel pool cooling heat exchanger was installed.

Scope of Evaluation

The seismic qualification of the relief valve was reviewed. In addition, the evaluation was expanded to address other issues related to the seismic qualification of service water components. This included the following:

1. Adequacy of the reroute of service water piping for the block wall modification (PDCR402 and AWO identified by Impell).
2. Adequacy of the scope of review conducted under I&E Bulletin 79-14.
3. Adequacy of methodology to address service water modifications consistently with respect to seismic qualification and flooding.

Conclusions of Evaluations

1. Seismic qualification for the specific change is not required. The failure of the specific change has no impact on safety.
2. Loss of all non-seismically qualified piping in the service water system will result in a reduction in flow so that the adequacy of the performance of the safety related functions may be jeopardized.
3. The sections identified for upgrade to meet I&E Bulletin 79-14 does not appear to be adequate.
4. With the uncertainty associated with seismic qualification, an appropriate methodology has not been demonstrated.

Deficiencies and Corrective Actions

1. An evaluation must be conducted for the service water system. Justification must be provided that the non-seismic piping, up to the first normally closed valve or valve capable of automatic closure, will not break or deform to the extent that service water to safety related components is lost. If this cannot be done, then additional pipe supports and/or isolation valves should be installed.

PDCR No. 671

TITLE Storage of Spare CRD's in Containment Sump

Scope of PDCR

Added storage structure in the containment sump for long term storage of used CRD's.

Scope of Evaluation

Determine if the aluminum conduit used in the CRD storage structure contributed significantly to the generation of hydrogen or was affected by TSP following an event which filled the containment sump.

Conclusions of Evaluations

Contribution of hydrogen evolving from this source was not significant. TSP had no affect on aluminum under these conditions.

Deficiencies and Corrective Actions

None.

PDCR No. 684

TITLE Replacement of RCS Loop RTDs

Scope of PDCR

A test to check the accuracy of the loop RTDs located seven which did not meet the acceptance criteria. These seven were replaced.

Scope of Evaluation

The evaluation covered the test used to check the accuracy of the RTDs, the analyses which supported the acceptance criteria, the suitability of the replacement RTDs, original design problems with the location of the RTDs in the loops, proposed plans to upgrade the RTD System, response time, testing and the affect on design basis accident analysis of the RTD replacement.

Conclusions of Evaluations

Justification for the acceptability range (plus or minus 3 degrees F) appears to be incomplete.

The upgrade of the RTD system as proposed is clearly beneficial. It also includes proposal to perform regular response time testing.

Deficiencies and Corrective Actions

1. A sensitivity study to determine if the acceptance band for the RTDs is appropriate for all power levels, and to determine its acceptability considering three loop operations should have been done. These have been requested of Reactor Engineering.

2. Response time testing should be done on a surveillance basis once the RTD system upgrades are complete.

ATTACHMENT 3

DEFICIENCIES IN SPECIFIC PLANT DESIGN CHANGES

Deficiency Number	PDCR No. and Title	Deficiency	Category	
1	294 RHR Purification Flow Valve Reach Rod	Piping is not seismically qualified.	Seismic	*
2	300 Diesel Sequencing Timers	Seismic Evaluation of the sequencing timers.	Seismic	
3	306 Containment Fan Filter Timers	No procedure to ensure continued proper functioning of the timers.	Procedural	
4	326 Fire Suppression System	Seismic evaluation of fire suppression system located above safety related equipment.	Seismic	
5		Impact of fire suppression fluids sprayed on safety related equipment.	Design	
6	333 Combustible Gas Detection System	No procedures to establish maintenance and calibration of the system.	Procedural	*
7	344 Containment Isolation Reset Modification	Inadequate training plan and procedures to adequately identify all steps necessary to clear SI/HCP block.	Procedural	
8	347 Reactor Coolant System Venting System	Uncertainty of ability of valves to function with water.	Design	
9		Failure to test valves against full differential pressure.	Testing	

Deficiency Number	PDCR No. and Title	Deficiency	Category	
10		Failure of AOP 3.2-22 to utilize revised calculations on venting times.	Procedural	
11		Failure to verify actual plug movement in surveillance tests.	Procedural	
12	368 RCP Seal Water Supply Valves	Uncertainty of seismic qualification of the RCP seal water system.	Seismic	
13	371 TMI 2.1.8 Additional Equipment to Follow Course Accidents	Inconsistent procedures as related to calculations.	Procedural	
14	380 RCP Component Cooling Water and Seal Water Isolation Modification	Inadequate dose analysis and Tech. Spec. treatment of charging system outleakage.	Safety Analysis	
15		Unevaluated impact of modification as related to reduced containment integrity.	Safety Analysis	
16		Inadequate procedures to assure prompt manual valve closure.	Procedural	
17		Seismic qualification of isolation valves and associated piping.	Seismic	
18		Faulty logic for activation of valve FCV-608.	Design	
19		Potential release path from containment via seal return line and relief valve CH-RV-332.	Design	*
20		Resolution of CYPDCTG Report "Containment Piping Penetrations".	Design	*

Deficiency number	PDCR No. and Title	Deficiency	Category	
30		Failure to assess degraded voltage operability of main lube oil pump motor.	Design	
31		Failure to upgrade several procedures.	Procedural	
32	626 Replacement of Foxboro Feedwater Flow Transmitters	Failure to establish the uncertainty of flow measurement.	Testing	
33		Failure to determine seismic adequacy of the Hagen flow transmitters.	Seismic	
34	634 Replacement of Foxboro Pressure Transmitters PT403 & PT404	Failure to seismically qualify instrument tubing.	Seismic	
35		Failure to clarify Reg. Guide 1.97 submittal.	Safety Analysis	
36	653 Vital Inverter Cabinet Ventilation	Failure to conduct seismic analysis on cabinets with actual component locations.	Seismic	
37	660 Relief Valve for Spent Fuel Pool Heat Exchanger	Failure to perform complete seismic analysis of service water system.	Seismic	
38	684 Replacement of RCS Loop RTDs	Incomplete review of acceptance limits for the RTDs.	Safety Analysis	*
39		Failure to conduct response time tests.	Testing	*

* Identified as action items within the framework of current NU programs prior to CYPDCTG Review.

6.2.5 Each CY PDCTG Member shall review the change selected from the screening, (Reference 3.2) to determine which of the phases require detailed review.

6.2.6 Based upon a consensus of CY PDCTG Members, the phases for detailed review shall be selected and the CY PDCTG Members that will perform the review shall be selected.

6.2.7 The CY PDCTG Chairman shall designate one of the members performing the review as Lead Evaluator.

6.2.8 To document the results of the Scope Review, the form given in Figure 7.1 shall be used.

6.3 Detailed Evaluations

6.3.1 Based upon the results of the Scope Review, detailed evaluations shall be performed. A list of the documentation to be considered in the review is given in Attachment 8.C.

6.3.2 The forms in Figures 7.2, 7.3, and 7.4 provide guidance for performing and documenting the review. Where applicable, the guidance given in Reference 3.4 shall be used in determining the Impact on the Plant Design Basis.

6.3.3 In reviewing the change for Impact on the Plant Design Basis, the as-built change shall be evaluated taking into account Design Change Notices, Design Change Revisions, and Field Changes.

6.4 Documentation

6.4.1 The individual evaluations shall be documented in sufficient detail to permit an independent review of the evaluation. The forms given in Figure 7.2, 7.3, and 7.4 provide an outline and format for each phase of the evaluation.

6.4.2 Based upon the individual evaluation, a summary evaluation shall be written. The written evaluation shall summarize the conclusions and recommendations of the individual evaluations including a list of deficiencies that have been noted.

6.4.3 The form given in Figure 7.5 provides a guide for the content, review and approval of the summary evaluation.

6.5 Input to the Evaluation of the Design Change Process

6.5.1 Each deficiency noted in the summary evaluation (Section 6.4) shall be documented in accordance with Reference 3.3 for use in the evaluation of the Design Change Process.

6.6 Alternate Evaluators

6.6.1 An Alternate Evaluator shall be selected to serve in the capacity of a CY PDCTG Member for a given plant change when that member is disqualified due to detailed involvement of the change being evaluated.

6.6.2 The form given in Figure 7.6 shall be prepared to assist in the review and approval of the Alternate Evaluator by the CY PDCTG Chairman. The Alternate Evaluator shall be at least a Senior Engineer Level.

6.6.3 The Alternate Evaluator shall be included in the approval of the summary evaluation.

6.6.4 The CY PDCTG Chairman may also use Figure 7.6 to review and approve Alternate Evaluators for absent members.

7.0 FIGURES

Figure No.	Figure Title
7.1	Scope Review Form
7.2	Impact on Plant Design Basis
7.3	Confirmation of Proper Implementation
7.4	Provisions for Continued Safe Operation
7.5	Summary Evaluation
7.6	Qualification of Alternate Evaluators
7.7	Flow Chart