MASONRY WALL FAILURE CONSEQUENCE ANALYSIS

Prepared for

GPU NUCLEAR CORPORATION
OYSTER CREEK NUCLEAR GENERATING STATION

Prepared by:

IMPELL CORPORATION
AUGUST, 1983

Report No. 02-0370-1132

Revision 0

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NEW YORK REGIONAL OFFICE

REPORT APPROVAL COVER SHEET

Client:	General Public Utilities Nuclear Corporation
Project:	Oyster Creek Nuclear Generating Station (OCNGS)
Job No.:	0370-043-1641/1671
Report Title:	Masonry Wall Failure Consequence Analysis
Report Number:	02-0370-1132 **Rev. No.:** 0

The work described in this Report was performed in accordance with the Impell Corporation Quality Assurance Program. The signatures below verify the accuracy of this Report and its compliance with applicable quality assurance requirements.

Prepared By:	Michael F. Ballard	**Date:** 8/5/83
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Approved By:	[signature]	**Date:** 8/11/83
Concurrence By:	S. A. Stanley Regional Quality Assurance Manager	**Date:** 8/11/83

REVISION RECORD

REV. NO.	PREPARED	REVIEWED	APPROVED	CONCURRENCE	APPROVAL DATE	REVISION
0	M.F. Ballard	G T Rahney	[signature]	[signature]	8/11/83	

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1.0 INTRODUCTION

In accordance with the requirements of NRC I.E. Bulletin 80-11, all masonry walls at Oyster Creek that are in proximity to or have attachments from safety related piping or equipment such that wall failure could affect a safety related system have been identified to the Nuclear Regulatory Commission. These walls are being upgraded to meet the required seismic standards. Of the masonry walls identified, twenty-five still require modifications.

In order to obtain a delay in the required wall repairs, GPUNC contracted Impell Corporation to perform a wall failure consequence analysis. This report documents the methodology and results of this analysis.

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2.0 METHODOLOGY

The purpose of this report is to determine if the failure of the masonry walls following a seismic event will impact on plant safety. This was accomplished in two phases. First, by identifying the components affected by the wall failure. Secondly, analyzing the effects of the component failures on the respective system and ultimately the impact on plant safety and ability to achieve a safe shutdown condition.

The methodology employed to complete this evaluation is summarized in this section. A detailed description of this methodology is contained in Appendix A, "Technical Procedures for the Performance of the Analysis".

2.1 Identification Phase

The first part of the identification phase consisted of an engineering evaluation to determine the direction of failure of the wall and the area of influence created by its failure. The area of influence is defined as the arc the wall develops during failure and the ground area impacted. Allowance was made on the ground area to include possible sliding or shifting of the wall upon impact. All walls are assumed to fail simultaneously following the seismic event.

A plant walkdown was then conducted. An itemized list of the components, cable trays, piping, and other equipment was developed for each area of influence. To maintain quality assurance, the walkdown team consisted of two engineers. One engineer initiated the itemized list while the other verified that every item was within the area of influence.

Subsequent to the plant walkdown, the itemized list was reviewed and equipment which had no impact on plant safety and not required to achieve a safe shutdown condition was determined. These lists are presented in a tabular format in Appendix D.

2.2 Analysis Phase

In the analysis phase, the list of equipment developed in the identification phase was evaluated and documented on the tables in Appendix C. Only the equipment and components related to plant safety are considered in the Appendix C evaluation. If a component is within the area of influence of a wall, it is assumed to fail in its worse mode. Cable trays were identified in the walkdown but the evaluation of their failure is not within the scope of this project.

The failure modes of each component, the effect on the system, and compensating provisions (i.e., redundant trains or alternate methods to achieve a protective function) are shown on the Wall Failure Consequence Analysis Tables. It is probable that a loss of offsite power would occur following a seismic event and is assumed for this evaluation. Also, systems which are not seismically designed such as feedwater, condensate, turbine bypass, ect., are not assumed functional.

The impact of the system failures on the plant's ability to achieve a safe shutdown condition was then determined. This review accounted for all systems (NSSS and BOP) that are affected by the system malfunctions and failures as well as those which could be utilized for safe shutdown pathways. The Oyster Creek Safe Shutdown Logic Diagram was utilized as the primary tool for this portion of the analysis.

No high energy line breaks or NSSS transients were assumed to occur as a result of the seismic event unless the pipe break transient could be a result of a block wall failure. Loss of off-site power will be considered however, other single failures and operator errors were not.

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3.0 RESULTS

The purpose of this evaluation was to determine if plant safety and its shutdown capabilities are compromised following the failure of the twenty-five masonry walls shown in Appendix B subsequent to a seismic event. The results of this project are divided into two major areas:

1. Identificaion of equipment affected by masonry wall failure.
   - o Determine area of influence after wall failure
   - o Conduct walkdown to identify affected equipment
2. Analysis of the equipment failures.
   - o Effect of equipment failures on its associated system
   - o Affect of system performance on plant safety
   - o Identify normal or alternate methods of achieving plant safety functions

This section provides a summary of the results determined by Impell with respect to the two major areas. A more detailed item-by-item listing of the results is contained in Appendix C.

3.1 Identification

Prior to performing the walkdown, Impell reviewed the GPU Technical Specification for this project (SP-1302-53-011, Revision 0) to identify the masonry walls. The walls were then located on general arrangement drawings to determine the area of influence following wall failure. The area of influence is illustrated on Figures B-1 through B-4, Appendix B.

Subsequent to this, the plant walkdown was then performed. All equipment (piping, heat exchangers, pumps, cable trays, etc.) located within the area of influence was identified. This information is presented in tabular format in Appendix D.

3.2 Analysis

The list of equipment developed during the walkdown was reviewed. The equipment which could affect plant safety or is utilized to achieve the plant protective functions required for plant shutdown were evaluated and documented in the Appendix C Wall Failure Consequence Tables.

The protective functions are defined in Table C-1 (Appendix C) and are based on the Oyster Creek Safe Shutdown Logic Diagram. The remainder of this section describes how the protective functions are affected by each wall failure. A summary of how the shutdown systems are affected is provided in Table C-2.

Reactivity Control

Reactor scram will be successfully achieved through the RPS. The RPS could be affected by a failure of wall 25 in the cable spreading room and walls 2 and 16 in the control room. However, wall 25 is braced on the outside surface. On the inner surface (cable spreading room side) conduit and equipment are mounted on or near the wall. This increases the rigidity of the wall and minimizes its probability of failure. If wall 25 was to fail, its distance of travel and therefore, momentum generated would be restricted by equipment located near it. If the RPS was affected by a wall failure, a scram could occur due to loss of power to the RPS. A scram could also occur due to a loss of condenser vacuum assuming loss of offsite power.

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Reactor Heat Removal

Primary methods of initial reactor heat removal are the isolation condensers or operating the electro-magnetic relief valves (EMRVs) while maintaining reactor level. Both of these methods are affected by wall failures. The automatic valve operation of isolation condensers is affected by walls 31 and 32 failing. EMRV operation is affected by walls failing in the 480V switch gear room (21, 22, 23), control room (2, 16) and battery room (17, 18). These valves will still function to provide reactor vessel overpressure protection but can not be utilized to manually depressurize the reactor.

In the long term core spray or the shutdown cooling system are the preferred methods. These systems can only be utilized after the reactor vessel has been depressurized. However, these systems cannot be operated from the control room due to wall failures. Both systems are disabled due to 480V switch gear room wall failures. In addition, the core spray system recirculation operation is not possible due to the loss of torus water following the rupture of containment spray piping caused by wall 29 failure.

In summary, the most viable method to remove decay heat is to use the isolation condenser by manually operating the isolation condenser suction and discharge valves. The condensate transfer system can maintain level in the condensers and is powered from the emergency diesels but it may not be seimically qualified. The fire water system may also be available to maintain I.C. level, if it survives the seismic event.

Pressure Control - Reactor System

The safety valves will provide overpressure protection. The EMRVs cannot be manually operated as discussed above. The reactor vessel will depressurize as it is cooled down utilizing the emergency condensers.

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Reactor Vessel Level Control

The feedwater system is not able to maintain level for the following reasons: loss of offsite power, system is non-seismic outside containment, and instrumentation and controls are lost in the control room.

The control rod drive system is a possible method to provide makeup and the pumps can be powered from the emergency diesels. However, the CRD pump suction line from the CST is affected by the failure of wall 24 in the turbine building.

The only method to provide makeup water is through the fire water injection through the core spray piping if the fire water system survives the initiating event.

Containment/Reactor Vessel Isolation

This is normally achieved by closing the containment and main steam isolation valves through the RPS. Being designed as a fail safe system, the containment isolation valves should close on loss of power or failure of the RPS. The isolation panel 11F in the control room is hit by walls 3 and 5. Thereby eliminating the possibility of manual control of the valves.

The containment spray heat exchangers, pumps, and discharge piping to the torus are impacted by walls 29, 30, 31, and 33. This may rupture the piping and cause a breach of containment integrity. If the safety valves are lifted, the steam would discharge to the torus, through the containment spray piping, and directly to the reactor building at the 23'-6" and -19'-6" levels.

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Establish Reactor Building Containment

This is accomplished through operation of the reactor building ventilation system. Operation of this system is threatened by the failure of the walls in the 480V switch gear room and control room. The system could fail in such a way as to provide a radiation release path to the outside environment.

Containment Temperature and Pressure Control

This protective function cannot be achieved due to the failure of the containment spray system and the containment HVAC. The containment HVAC is lost due to the control room and 480V switch gear room wall failure. Containment spray is lost due to the loss of the torus, 480V switch gear room and control room wall failures.

Control Station Habitability

Not possible due to wall failures in the control room.

Post-Event Monitoring

Control room instrumentation is not available to monitor plant conditions following the event. Local instrumentation in the plant must be utilized.

Suppression Pool Inventory Control and Cooling

Inventory control is normally supplied by core spray injection from CST. Cooling is provided by the containment spray system in test mode. Both systems are assumed to fail as discussed above. The torus is also assumed to be drained after the rupture of the containment spray pump suction line (wall 29).

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4.0 CONCLUSION

The equipment which could affect plant safety or is utilized to achieve the plant protective functions required for plant shutdown is affected by the following wall failures:

1, 2, 3, 4, 5, 6, 7, 16, 21, 22, 23, and 42

These twelve walls will be structurally modified prior to restart from the current 1983-1984 refueling outage with the exception of wall 42. Wall 42 was removed above the cable trays. Wall 42 was previously designated as a wall requiring addition of boundary supports. The removal of the top of the wall eliminated the requirement for boundary supports.

Walls whose failure does not directly affect plant shutdown are as follows:

8, 15, 17, 18, 19, 20, and 25

These walls will be modified prior to restart from the following refueling outage. Walls 24, 29, 30, 31, 32 and 33 will be reanalyzed to determine if the ESW and containment spray piping can maintain structural integrity after wall failure. If the analysis determines that the wall failures have a negative effect of the containment spray piping, wall 24, 29, 30, 31, 32 and 33 will be modified prior to restart.

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5.0 REFERENCES

General

1) GPUNC Specification No. 1302-53-011, Revision 0, "Block Wall Failure Consequence Analysis", dated April 19, 1983.

2) Oyster Creek Systems Orientation Manual, Issue Date January 17, 1980.

3) Oyster Creek Safe Shutdown Logic Diagram, Drawing No. 0370-043-1671-001, Sheets 1 to 20 (Preliminary)

General Arrangment and Piping Drawings

Drawing No.	Revision
B&R 2060	4
B&R 4509	3
B&R 4517	8
B&R 4513	3
B&R 4510	3
B&R 4511	7
B&R 2051	6
B&R 2055	3
B&R 2062	2
B&R 2064	4
B&R 2063	4
B&R 2061	5
B&R 2136	4
B&R 2054	3
B&R 2052	3
B&R 2145	9
B&R 2146	9
B&R 2150	9
B&R 2151	6
B&R 4514	2
B&R 3161	16
B&R 2139	11
B&R 2053	3
B&R 2050	3

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Piping and Instrumentation Diagrams

GE 148F711
GE 148F262
GE 148F740
GE 885D781
GE 237E487

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APPENDIX A

TECHNICAL PROCEDURE

IMPELL CORPORATION

PROJECT INSTRUCTION

TITLE: Wall Failure Consequence Analysis	
INSTRUCTION NUMBER: 0370-043-001	**PAGE 1 OF** 13

CLIENT: GPU Nuclear Corporation

PROJECT: Oyster Creek Nuclear Generating Station (OCNGS)

JOB NUMBER(S): 0370-043

DIVISION(S) 1641/1671

REV.	ISSUE DATE	PREPARED	APPROVED
1	8/5/83	M.F. Ballard	G.T. Rahmn

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1.0 BACKGROUND AND PURPOSE

The USNRC IE Bullentin 80-11 dated May 8, 1980 requires that all power reactor facilities with an operating license to:

1. Identify all masonry walls in the facility which are in proximity to or have attachments from safety-related piping or equipment such that wall failure could affect a safety-related system.

2. Provide a reevaluation of the design adequacy of the walls identified in Item 1 avove to determine whether the masonry walls will perform their intended function under all postulated loads and load combinations.

GPU has completed this evaluation for OCNGS, however, the modifications required to upgrade twenty-five of the walls has not been completed.

To provide justification for interim operation (operation of one more operating cycles), analysis must be performed to determine the impact on plant safety and shutdown capability assuming that these 25 walls simultaneously fail following a seismic event. GPU has contracted Impell Corporation to perform this analysis. Impell will identify all safety-related systems associated with each wall and the effect that the failure of the wall may have on the ability of the plant to achieve a safe shutdown condition.

The purpose of these Project Instructions contained herein is to define the methodology developed by Impell to respond to these requirements. Project Instructions Change Notices will be issued in the event that the scope of work is modified or that new tasks are identified which fall outside the scope of existing tasks. The procedure for making changes to the Project Instructions is contained in Appendix B.

2.0 PROJECT INSTRUCTIONS

The Project Instructions delineated herein by task number correspond to the tasks identified in the Scope of Work section of Impell proposal B/P No. 37-106, Rev. 1.

Task 1 - Preliminary Engineering

During this task, each of the twenty-five (25) walls, identified by GPU, will be reviewed to determine the direction of failure of the wall. The direction of failure will consider whether the wall will essentially hinge about its horizontal axis, vertical axis or a combination of both axes. Once this is determined, the area of influence for each wall will be developed. The area of influence will address the arc the wall develops during failure and the ground area impacted by the failed wall. The area of influence for each wall will be indicated on the appropriate plant drawings, and these drawings will be used during the plant walkdown (Task 2) to identify the piping, equipment, cable trays and the like impacted by the failure of each designated wall. This task will also provide the walkdown teams with a working knowledge of the walls and adjacent areas prior to the actual walkdown.

As directed by GPU, the walls will be considered to fail as integral units. Partial failure, the development of missiles, etc., will not be addressed.

Task 2 - Plant Walkdown

A plant walkdown will be conducted to determine the exact piping, cable trays, equipment and the like attached to each wall and within the area of influence of each wall. An itemized list will be developed for each wall.

The walkdowns will be performed by a team of engineers each well-versed in civil/structural engineering and systems engineering. One (1) engineer will initiate the itemized list and the other engineer will assure that every item attached to the wall and within the area of influence is indicated on the list. Sufficient information will be obtained to determine the associated system and function for each item indicated on the list. Cables and conduit will not be included as part of this evaluation as directed by GPU. Cable trays will be identified but not evaluated in the system evaluation (Task 5).

The plant walkdown will be coordinated with Oyster Creek M&C and Operations personnel. These personnel will be available to assist in providing access to the walls, should the need arise.

Task 3 - Document Review

The objective of this task is to assemble and review all relevant information required for the system evaluation. It is expected that the majority of the information required already exists at Impell' from the past projects on the Oyster Creek Safe Shutdown Logic Diagram (SSLD) development, Fire Hazards Analysis and other projects Impell has completed for Oyster Creek.

As part of this task, Impell will thoroughly review the SSLD's and determine the systems and components that are required to achieve each safety function for a safe shutdown condition.

Task 4 - Determination of Affected Equipment Dependency on Safe Shutdown

In this task, Impell will review the list of impacted equipment and components, developed in Task No. 2 (Plant Walkdown), and determine the equipment required to achieve a safe plant shutdown following a seismic event.

Task 5 - System Evaluation

The objective of this task is to determine the effect of the equipment failures on plant performance and ultimately on plant safety should all of the walls fail concurrently. This task will be performed utilizing a Failure Consequence Analysis approach and will be documented by means of the table provided in Figure 1. This task would be divided into two subtasks:

Subtask 5.1 - Failure Consequence Analysis

A Failure Consequence Analysis will be performed on each component that is effected by the concrete wall failures and that is determined to be necessary to achieve safe shutdown. The failure mode for each component affected (identified in Task 4) would be determined, and then the effect on the associated system for each failure mode would be addressed. The failure modes of each component, the effect on the system, methods of equipment failure detection and compensating provisions (i.e., redundant trains or alternate methods to achieve a safety function) would be shown on the Failure Consequence Analysis Table.

Subtask 5.2 - Determine Impact on Plant Performance and Safe Shutdown

Based upon the Failure Consequence Analysis developed in Subtask 5.1, Impell would evaluate the impact of the system failures on the plant's ability to achieve a safe shutdown condition. This review would account for all systems (NSSS and BOP) that are affected by the system malfunctions and failures, as well as those which could be utilized for safe shutdown pathways. No high energy line breaks or NSSS transients will be assumed to occur as a result of the seismic event (unless the transient could be a result of a block wall failure). Loss of off site power will be considered however, other single failures and operator errors will not be considered.

Task 6 - Report Submittal

The objective of this task is to document all methods, assumptions, analysis results, conclusions and recommendations.

Impell would prepare a report describing the work performed, the assumptions and bases used, the results (including all Failure Consequence Analyses), findings and recommendations. This report would be submitted in conjunction with an oral presentation.

3.0 QUALITY ASSURANCE

1. Engineering work associated with each of the tasks in Section 2.0 will be performed in accordance with Revision 16 of the Impell Quality Assurance Manual.

2. The checking criteria to be used for this work is itemized below. This criteria is in addition to those items set forth in Attachment A of Impell QAP 3.6 of Rev. 16 to the QA Manual.

   a. System and Component Identification in area of Wall Failure

      1. Is the System Identified?

      2. Are the Components Identified?

      3. Is the Wall Identified?

6. Wall Failure Consequence Analysis

   a. Is the wall indicated?

   b. Are the systems affected given?

   c. Are the components associated with the affected system indicated?

   d. Are the failure modes, symptoms and local effects, inherent compensating features and effects upon system/plant performance shown?

APPENDIX A

FIGURES

FIGURE 1

WALL FAILURE CONSEQUENCE ANALYSIS

Sheet ____ of ____

Concrete Wall Identification: _____

System Affected: _____

Job No. _____
Prepared by: _____ Rev. _____
Date: _____ Date: _____
Checked by: _____ Date: _____
Approved by: _____

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon	Summary: Effect Upon Plant Performance

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PROJECT INSTRUCTIONS CHANGE NOTICE LOG

Project: _____

Client: _____ Project Instruction No.: _____

Job No.: _____ Revision No.: _____

PICN	DATE	SUBJECT AND/OR DESCRIPTION	STATUS

ATTACHMENT A

FILE: QA-PQAF

COPY:

IMPELL CORPORATION

PROJECT INSTRUCTIONS CHANGE NOTICE

PICN No.: _____

Project: _____

Client: _____ Project Instruction No.: _____

Job No.: _____ Revision No.: _____

Prepared By: _____ Date: _____

Approved By: _____ Date: _____

Concurrence By: _____ Date: _____

Pg. 1 of __

ATTACHMENT B

APPENDIX B

CHANGES TO THE PROJECT INSTRUCTIONS

Change to the Project Instructions are to be handled as follows:

1. Changes to the Project Instructions must be properly controlled. Minor changes shall be controlled by the Project Instruction Change Notice Log (Figure 2) and the Project Instruction Change Notice (PICN) (Figure 3). Major changes shall be controlled through revisions. Each new revision shall incorporate the PICN's issued since the last revision. Both PICN's and revisions to Project Instructions must be prepared, approved and concurred with the level of personnel commensurate with those that originally signed the Project Instructions.

2. The PICN Log in the Project QA File (with the Project Instructions) shall be the master copy and kept current by the Project Engineer. PICN's shall be distributed to all personnel that receive copies of the Project Instructions.

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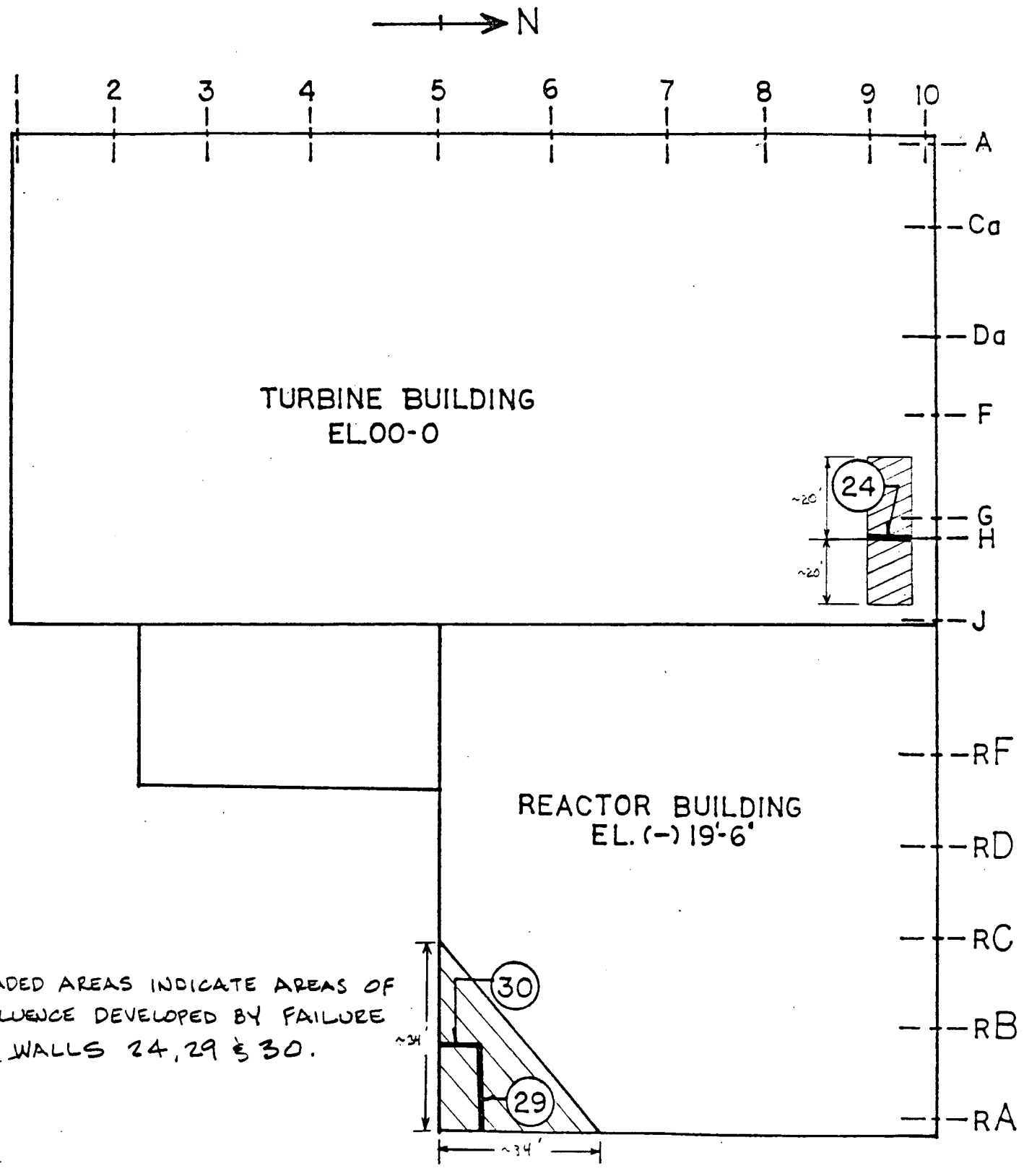
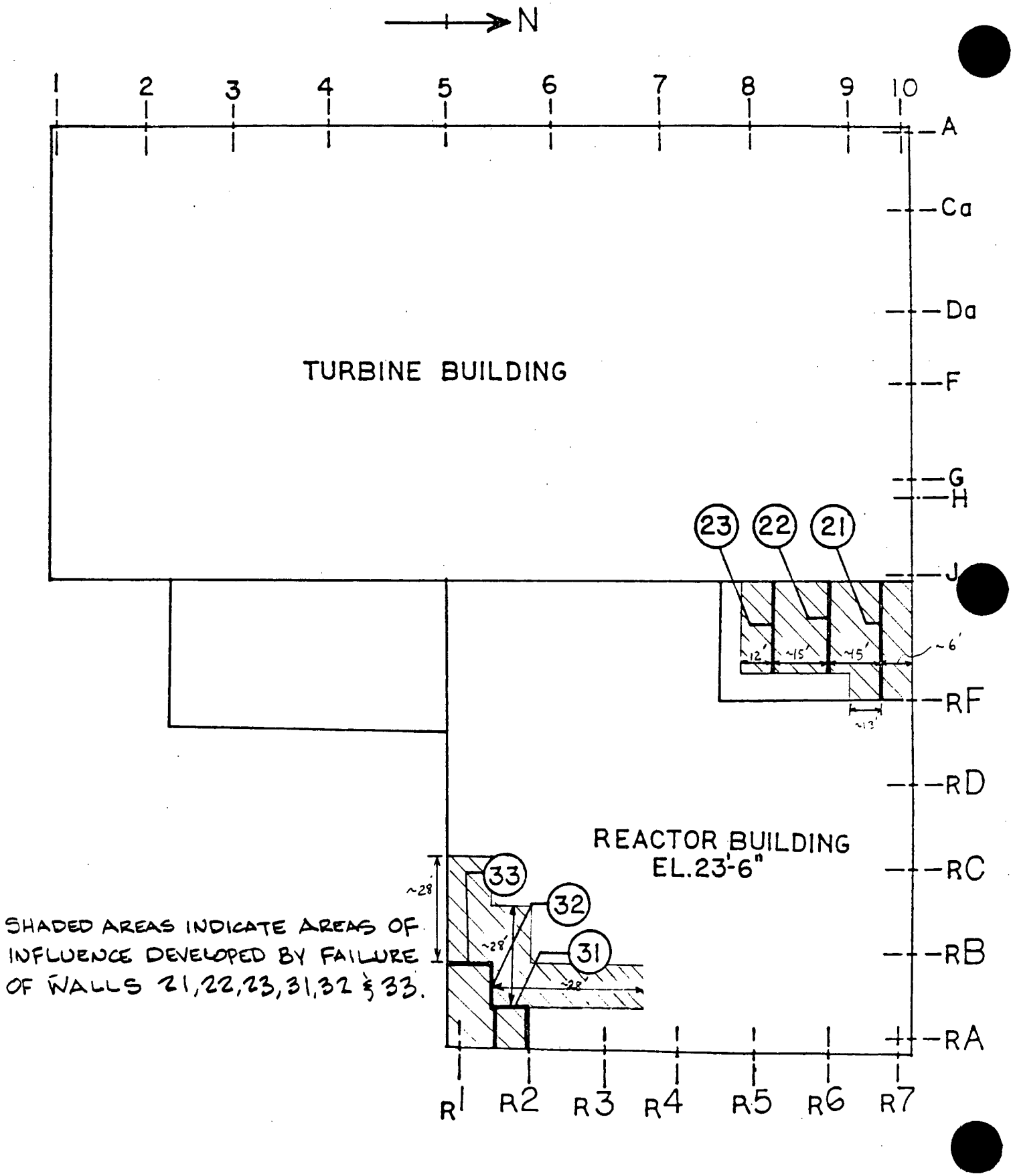
APPENDIX B

MASONRY WALL FIGURES



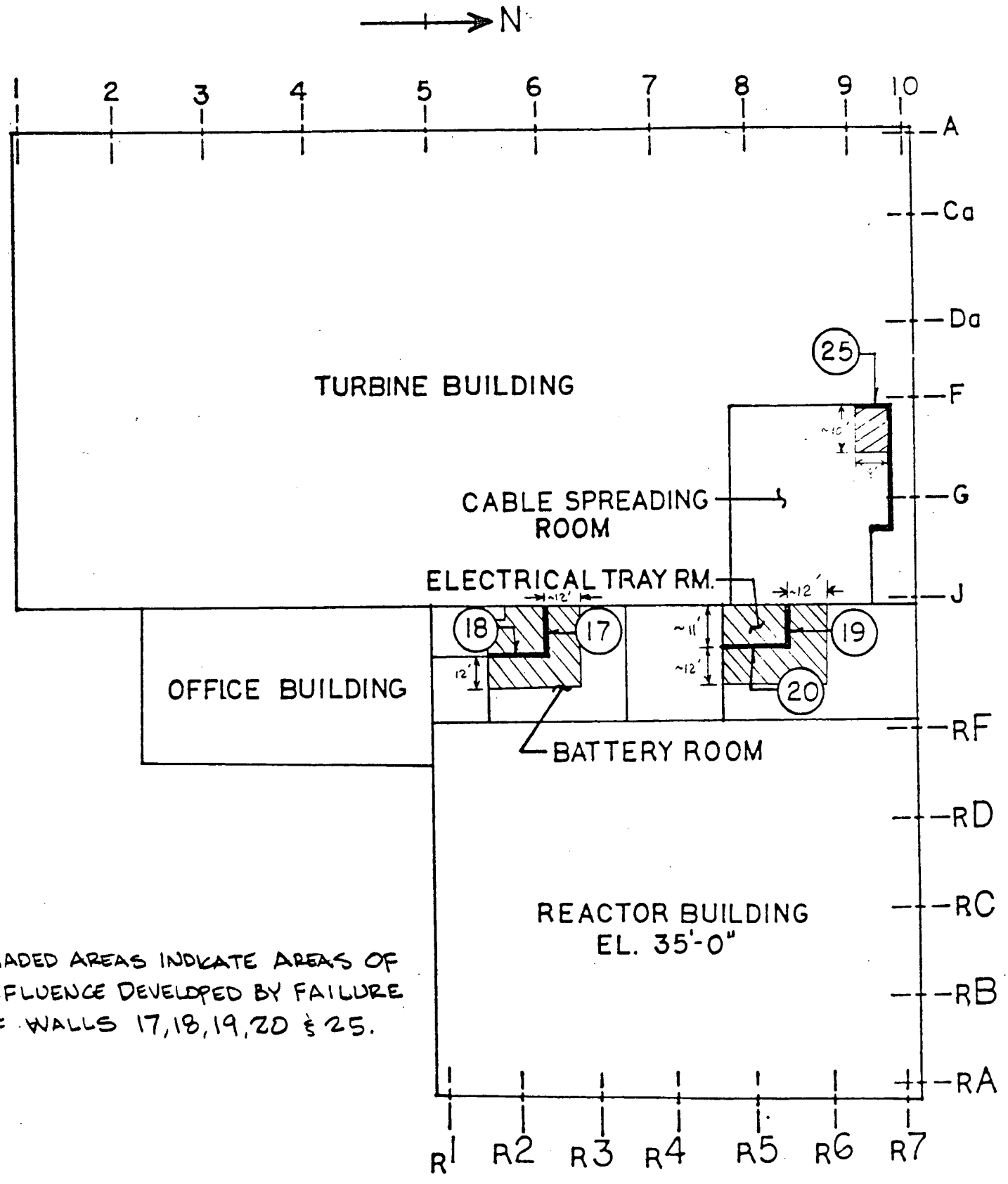
OCNGS MASONRY WALL FAILURE ANALYSIS

FIGURE B-1



OCNGS MASONRY WALL FAILURE ANALYSIS

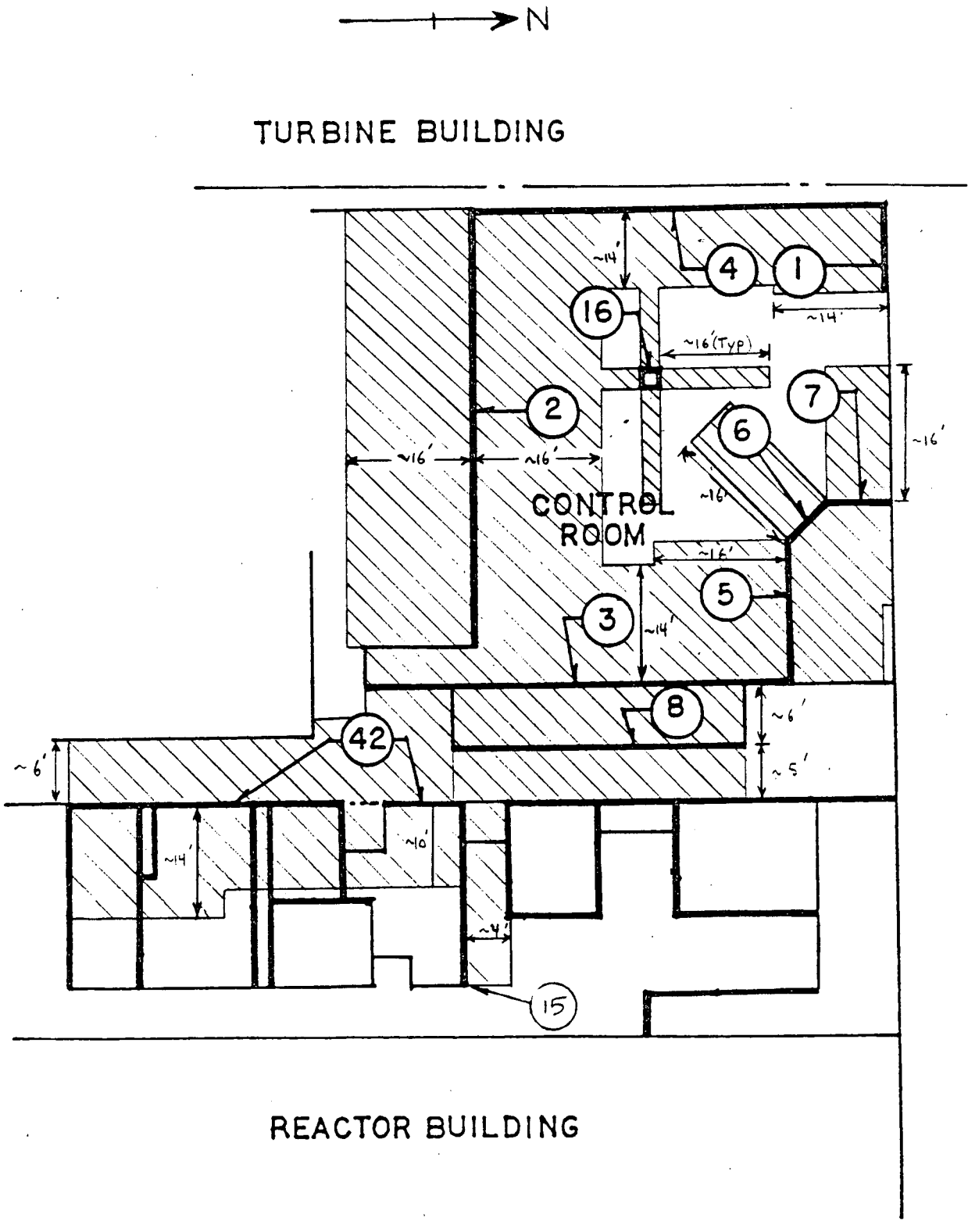
FIGURE B-2



SHADED AREAS INDICATE AREAS OF INFLUENCE DEVELOPED BY FAILURE OF WALLS 17, 18, 19, 20 & 25.

OCNGS MASONRY WALL FAILURE ANALYSIS

FIGURE B-3



SHADED AREAS INDICATE AREAS OF INFLUENCE DEVELOPED BY FAILURE OF WALLS 1 THRU 8, 15, 16 & 42.

OCNGS MASONRY WALL FAILURE ANALYSIS

FIGURE B-4

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APPENDIX C

WALL FAILURE CONSEQUENCE ANALYSIS TABLES

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MASONRY WALL FAILURE CONSEQUENCE ANALYSIS

TABLE C-1

PROTECTIVE FUNCTIONS

Protective Function	Functional Description
Reactivity Control	Rapid insertion of negative reactivity into the core to produce subcriticality immediately following an evaluated event.
	Insertion of negative reactivity into the core sufficient to compensate for positive reactivity addition resulting from the event.
	Establishment of a sufficient poison concentration in the core such that the reactor is maintained subcritical following the event.
Reactor Heat Removal	Cooling of the core by SCS system to a cold shutdown state.
Pressure Control - Reactor System	Maintenance of the reactor system pressure within allowable limits and ensuring that the system pressure is maintained greater than saturation pressure associated with the temperature at the hottest point in the system.
Level Control - Reactor System	Maintenance of the reactor system water level within allowable limits.

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TABLE C-1
(Continued)

PROTECTIVE FUNCTIONS

Protective Function	Functional Description
Containment/Reactor Vessel Isolation	To prevent loss of inventory from reactor and to prevent escape of radioactivity inside the containment to the reactor building.
Establish Reactor Building Containment	To prevent escape of radioactivity inside the Reactor Building to the environs.
Containment Temperature and Pressure Control	Maintenance of containment pressure and temperature within allowable limits when containment integrity is required.
Post-Event Monitoring	Provision of instrumentation necessary to monitor plant variables and systems during and following an event in order to: 1. Determine nature of the event. 2. Predict course of the event. 3. Evaluate systems performance. 4. Evaluate response. 5. Determine action necessary to protect the public. 6. Provide damage assessment information. 7. Provide post-accident evidence.

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TABLE C-1
(Continued)

PROTECTIVE FUNCTIONS

Protective Function	Functional Description
Suppression Pool Inventory Control	Supply of water to suppression pool.
Suppression Pool Cooling	Cooling of suppression pool during event conditions and thereafter.
Control Station Habitability	Conditioning of the post-event control station atmosphere to ensure habitability and control of personnel radiation exposure.

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TABLE C-2

AFFECT OF WALL FAILURE ON PLANT SYSTEMS

FAILED SHUTDOWN SYSTEM	CAUSE OF FAILURE	COMMENTS
Shutdown Cooling System	Reactor Building Walls 31, 32; Switch Gear Room Walls 21, 22, 23; Control Room Walls 2, 3, 6, 16; Battery Room Walls 17, 18	Both trains disabled.
Core Spray System	Switch Gear Room 21, 22, 23; Battery Room Walls 17, 18; Control Room Walls 2, 3	Both trains disabled.
Feedwater System	Loss of Offsite Power; not seismic design	Operation not probable
Fire Water System	Loss of Offsite Power, not seismic design	May be operable if it survives the seismic event. Has own diesel pumps.
Condensate Transfer System	Not seismic Control Room Walls 6, 16	May be operable if it survives the seismic event.
Control Rod Drive System	Turbine Building Wall 24	Pipe ruptured. CST to pump suction

OYSTER CREEK NUCLEAR GENERATING STATION
MASONRY WALL FAILURE CONSEQUENCE ANALYSIS

TABLE C-2
(Continued)

AFFECT OF WALL FAILURE ON PLANT SYSTEMS

FAILED SHUTDOWN SYSTEM	CAUSE OF FAILURE	COMMENTS
Emergency Diesel Generators	Battery Room 17, 18; Control Room Walls 6, 7	DC Power for breakers control and indication at panels 9XF, 8F, and 9F
Reactor Protection System	Cable spreading room wall 25; control room walls 2, 16; switch gear room walls 21, 22, 23.	Both channels lo should fail safe
Electomatic Relief Valves	Switch gear room walls 21, 22, 23; battery room walls 17, 18; control room walls 2, 3	Manual operation not possible
Emergency Condenser System	Reactor Building Walls 31, 32; Control Room Walls 2, 3; Battery Room walls 17, 18	Auto control of valves disabled.
Containment Spray System	Reactor Building Walls 29, 30, 31, 33; Switch Gear Room Walls 21, 22, 23; Control Room Walls 2, 3; Battery Room Walls 17, 18	Pipe ruptured, torus drained, containment isolation not possible. Both trains lost.

Job No. 0370-043-1671
Prepared by: M. Ballard
Date: 8/5/83 Rev. 0
Checked by: [illegible] Date: 1/12/83

Concrete Wall Identification: 1 - Control Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
14XR	Disabled	Loss of Meteorological Recording Instrumentation.	None	None	None. Not required for Plant Shut Down.
14R	Disabled	Main Steam System Valve Indication Lost.	None	None	None. Not required for Plant Shut Down.
13R	Disabled	Turbine Generator Monitor Instrumentation failure.	None	None	None. Not required for Plant Shut Down.
12XR	Disabled	Loss of Recording and Indication for Turbine Generator Drywell parameters.	None	None	None. Not required for Plant Shut Down.
9XR	Disabled	Loss of Recording for Turbine Metal Temperature and Torus Level.	None	None	None. Not required for Plant Shut Down.
11R	Disabled	Loss of gas treatment and HVAC Controls.	None	None	None. Not required for Plant Shut Down.
10R	Disabled	Loss of Indication and Alarms for Core Spray, Containment Spray, and SD Cooling.	None	None	None. Not required for Plant Shut Down.
9R	Disabled	Loss of Indication and Alarms for Feed Water and Recirculation System.	None	None	None. Not required for Plant Shut Down.

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 2 - Control Room

System Affected: As Listed Below

Job No. 0370-043-1691
Prepared by: M Ballard
Date: 8/5/13 Rev. 0
Checked by: D. Kalman Date: 8/12/13

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
15R	Disabled	VMS Control Cabinet Lost.	None	None	None. Not required for Plant Shutdown.
16R	Disabled	Recorder Panel for H_2 and O_2 in Drywell.	None	None	None. Not required for Plant Shutdown.
11XR	Disabled	Turbine Generator Indicators Lost.	None	None	None. Not required for Plant Shutdown.
4R	Disabled	TIP Channels 1-4 Controls Lost.	None	None	None. Not required for Plant Shutdown.
3F	Disabled	Cleanup and Recirculation Controls Lost.	None	None	None. Not required for Plant Shutdown.
12F	Disabled	Plant Electrical Dist. System Status, Controls, and Relays Lost.	None	None	None. Not required for Plant Shutdown.
1R/2R	Disabled	Loss of Process, and Area Radiation Monitoring.	None	None	None. Not required for Plant Shutdown.
6R/6XR	Disabled	RPS Channel No. 1 Lost.	RPS Channel No. 2 Lost (Panel 7R) when Wall 16 fails.	Loss of 2 RPS Channels.	RPS designed fail safe. Reactor scram will occur on loss of power.
3R/5R	Disabled	Neutron Monitoring Lost. APRM & LPRM Monitoring Lost	None	Both Trains disabled.	Indication of power level is needed to monitor the core during shut down.

Concrete Wall Identification: 2 - Control Room

System Affected: As Listed Below

Job No. 0370-073-1671
Prepared by: M Patton
Date: 1/5/93 Rev. 0
Checked by: [illegible] Date: 1/12/93

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
1F/2F	Disabled	Loss of shut down system controls: Containment Spray Core Spray Emergency Cond. Comp. Cooling Water SD Cooling	None	Normal Control for both trains lost.	Plant Shutdown from inside the Control Room is not possible.
4F	Disabled	Loss of control rod selector, control, and indication.	None	Normal Controls Lost.	Plant Shutdown from inside the control room is not possible.
17R	Disabled	Loss of Reactor Level Indication.	None	Loss of Indication of Reactor Wide Range Level.	Reactor Wide Range Level Data not available.

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 3 - Control Room

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M. [illegible]
Date: 8/5/83
Rev. 0
Checked by: J. R[illegible]
Date: 8/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
10XF	Disabled	See Wall 5 for Details			
10F	Disabled	See Wall 5 for Details			
11F	Disabled	See Wall 5 for Details			
1F/2F	Disabled	See Wall 2 for Details			
1R/2R	Disabled	See Wall 2 for Details			
12F	Disabled	See Wall 2 for Details			
11R	Disabled	See Wall 5 for Details			

WALL FAILURE CO[illegible]NCE ANALYSIS

Job No. 0370-043-1671
Prepared by: M. Bollard
Date: 8/5/83 Rev. 0
Checked by: [illegible] Date: 9/12/83

Concrete Wall Identification: 4 - Control Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Cable Panels					
17R	Disabled	See Wall 2 for Details			
16R	Disabled	See Wall 2 for Details			
11XR	Disabled	See Wall 2 for Details			
12R	Disabled	Loss of Generator Output Indicators.	None	None	None. Not required for plant shutdown.
12XR	Disabled	See Wall 1 for Details			
13R	Disabled	See Wall 1 for Details			
14R	Disabled	See Wall 1 for Details			

WALL FAILURE CONSEQUENCE ANALYSIS

Job No. D370-043-161
Prepared by: Michael F Baker
Date: 8/5/83 Rev. 0
Checked by: Gregory T Rahn Date: 9/12/83

Concrete Wall Identification: 5 - Control Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Communications	Disabled	Loss of Emergency Telephone to NRC, County, News, etc.	None	None	None. Not required for plant shutdown.
Control Panels					
10XF	Disabled	Loss of Recombiners and Offgas System Controls.	None	None	None. Not required for plant shutdown.
10F	Disabled	Loss of area and vent radiation monitors.	None	None	None. Not required for plant shutdown.
11F	Disabled	Loss of Containment Isolation Valve Manual Control and Indication.	Valves should be isolated automatically if RPS functions properly.	Manual Valve Operation from the Control Room is not possible.	Manual Valve operation may be possible at the valve or local panels in the plant.
12F	Disabled	See Wall 2 for Details			
11R	Disabled	Loss of Containment Ventilation	Loss of Drywell Recirculation Fans.	Operation of Fans from Control Room is not possible.	Operation of Fans may be possible from MCC in 460V Switchgear Room by Electrical Bypassing Control Room operation. New remote shutdown panel could provide this option.

WALL FAILURE CO[illegible]NCE ANALYSIS

Job No. 0372-043-1271
Prepared by: M. Ballard
Date: 8/5/83
Checked by: [illegible]
Rev. 0
Date: 9/12/83

Concrete Wall Identification: 6 - Control Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
8F/9F	Disabled	Loss of Diesel Generator Instrumentation & Controls.	None	Unable to monitor control and indication	Control and monitoring of the diesel generators not possible
7F	Disabled	Main Steam and Turbine Generator Controls not available.	None	System not required.	None. Turbine will be tripped.
5F/6F	Disabled	Loss of Status and Controls for Feedwater and Steam.	None	System not required.	None. Turbine will be tripped.

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 7 - Control Room

System Affected: As Listed Below

Job No. 0370-C93-1671
Prepared by: M Ballard
Date: 9/3/93 Rev. 0
Checked by: J Pal Date: 9/12/93

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
9XF	Disabled	Loss of Indication and Controls for Station Batteries, Chargers, and Emergency Diesel Generator No. 2.	None	Battery Stations A & B are lost due to Wall 17 & 18 failures in Battery Room. Diesel Generators will start automatically if RPS functions.	See Wall 17 & 18 for effect of Battery Station A & B failure.
8F/9F	Disabled	Loss of Main Generator and Auxiliary Power Controls and Indication.	None	Unable to monitor control and indication.	Control and Monitoring of the Diesel Generators not possible.
11R	Disabled	Loss of gas treatment and HVAC Controls.	None	None	None. Not required for Plant Shutdown.

Job No. 0370-043-167
Prepared by: M Ballard
Date: 8/5/83 Rev. 0
Checked by: M. Rehm Date: 8/12/83

Concrete Wall Identification: 8 - Office Building El. 46'-6"

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Vital Lighting Panels VLP 1 & LP-4	Off	Loss of Lighting to Control Room Cable Spreading Room, and Swgr. Room	Emergency or Portable Lighting would be utilized.	None	None

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 15 & 42 Office Building - 3rd Floor

System Affected: As Listed Below

Job No. 0377-043-K71
Prepared by: M. Ballard
Date: 8/5/83
Checked by: J Rahm
Rev.
Date: 9/2/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Ventilation Duct Cables and Trays	Off	Loss of Area Cooling.	None	None	None

Job No. 0370-043-1671
Prepared by: M Ballard
Date: 1/5/83 Rev. 0
Checked by: J Rolla Date: 1/12/83

Concrete Wall Identification: 16 - Control Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
4F	Disabled	See Wall 2 For Details			
5F/6F	Disabled	See Wall 6 For Details			
3R	Disabled	See Wall 2 For Details			
4R	Disabled	See Wall 2 For Details			
5R	Disabled	See Wall 2 For Details			
6R/6XR	Disabled	See Wall 2 For Details			
7F	Disabled	See Wall 6 For Details			
7R	Disabled	RPS Channel No. 2 Lost	RPS Channel No. 1 Lost (Panel 6R) when Wall 2 fails.	Loss of 2 RPS Channels	RPS designed fail safe Reactor Scram will occur on loss of power.
8R	Disabled	Reactor Temperature Indication.	Loss of Temperature Recorders.	Loss of Recirculation Pump Temperature Indication.	None. Not required for plant shutdown.
9R	Disabled	See Wall 1 For Details	None	None	None

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 17 & 18 Office Building Battery Room

System Affected: As Listed Below

Job No. 2370-043-1671
Prepared by: M. Ballard
Date: 8/5/83
Checked by: [illegible]
Rev. 0
Date: 8/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Main Battery Station A & B	Off	Loss of 125 VDC Power from Batteries "A" and "B"	Battery "C" is available	Battery "C" is D-C source for Division "A" safety related redundant loads.	DC power is available to Division "A" safety systems. DC power for 4160V SWGR 460V unit substation pump breakers. Note that Division "A" includes the unaffected train of containment spray which could be used with either train of core spray if these systems are available.
Rotary Inverter AC Motor, Panel and T.B. 21-1871	Off	Loss of AC Power to Continuous Instrumentation Panel No. 3.	Redundant train may be available.		

Concrete Wall Identification: 19 & 20 Office Building Electrical Tray Room

System Affected: As Listed Below

Job No. 0370-042-1671
Prepared by: M Ballard
Date: 2/3/83 Rev. 0
Checked by: D. Fisher Date: 2/2/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Ventilation Duct	Off	Loss of Area Cooling.	None	None	None
Voltage Stabilizing Transformer	Off	Function Undetermined.			
Cables and Trays				Contains Reactor Building Shutdown Circuits.	

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 21, 22, & 23 Office Building 480V Swgr. Room

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M Ballard
Date: 9/5/13 Rev. 0
Checked by: J. Rohr Date: 9/12/13

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Switchgear Unit Substation USS 1A2 and 1B2	Off	Loss of 480 V Power to both trains of Containment Spray Pumps Shutdown Cooling Pumps RBCCW Pumps CRD Feed Pumps Core Spray Booster Pumps Building Exhaust Fans Loss of Power to Vital Motor Controls Centers MCC-1A24 -1A2, 1B2 -1B21, 22, 1B21A, B -1A21, 22, 1A21A, B -1A23 -1A24 -1B24 -1B2B Lighting Dist. Pnls A2 & B2 Main Breaker 1A2M, 1B2M Tie Breaker Auxiliary Power Panel	None	None. Both Redundant Trains of essential systems lose power.	Normal shutdown systems not available to remove decay heat and maintain reactor level. Feedwater and Turbine bypass may be used if offsite power is available (if control is available from outside control room)
Swgr. Room HVAC	Off	Loss of Swgr. Room Cooling	None	Not required since all equipment is assumed lost.	None
MCCs - 1A2, 1A21 - 1B21	Off	Enveloped by USS 1A2 & 1B2 Failure.			
Panels ER-8A ER-18A	Off	Enveloped by USS 1A2 & 1B2 Failure.			
125VDC-F	Off	Loss of D.C Train A Circuits.			

Job No. 0370 - 043-1671
Prepared by: M Ballard
Date: 2/5/13 Rev. 0
Checked by: M Ballard Date: 2/12/13

Concrete Wall Identification: 21, 22, & 23 Office Building 480V Swgr. Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Instrument Panels IT-3, IT-4, IT-4A, B, C	Off	Enveloped by USS 1A2 & 1B2 failure.			
Instrument Panels 3 & 4	Off	Enveloped by USS 1A2 & 1B2 failure.			
Transformer IT-3, IT-4A, B	Off	Enveloped by USS 1A2 & 1B2 failure.			
Terminal Boxes A, B, F	Off	Enveloped by USS 1A2 & 1B2 failure. failure.			

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 24 - Turbine Building NE Corner

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M. Ballard
Date: 9/3/93 Rev. 0
Checked by: G. Rahm Date: 9/13/93

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Emergency Service Water Piping					
a. 14" SW-2	Rupture	ESW to Containment Spray Heat Exchanger 1-1 & 1-2	None	Train 2 of Containment Spray System cannot operate. However, Train 2 is already disabled by failure of walls 29, 30, 31, and 33.	Train 1 remains intact.
b. CRD Pipe	Rupture	Condensate Storage Tank Water to CRD Lost.	None	Loss of CRD makeup to Reactor Vessel capability	

Concrete Wall Identification: 25 - Office Building Cable Spreading Room

System Affected: As Listed Below

Job No. 0379-043-1671
Prepared by: M. Bullard
Date: 8/5/83 Rev. 2
Checked by: [illegible] Date: 9/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Reactor Protection System					
a. Batteries Pilot Cell	Off	Loss of DC Power to Control Room Panels: - 1R Liq. Process Rad. - 2R Area Rad. Monitor - 3R Neutron Monitoring Sys - 5R Neutron Monitoring Sys	None. Both DC Channels Lost.	Nuclear Instrumentation Input to RPS is disabled. Loss of all DC power is assumed to generate a reactor scram.	None. Reactor Scram will occur on interruption of power to RPS.
b. Battery Chargers	Off				
c. 24 DC Power Panel B	Off				
d. Motor Generator Set 1-2 Control Cabinet	Off	Loss of normal AC Power to RPS Panel 2		Loss of single power source initiates a channel trip.	
e. Terminal Boxes TB-21-1421, TB-21-1860	Off	MG 1-1 and 1-2 Controls loss of normal AC power to RPS.		Loss of all AC power to the RPS results in a reactor scram.	

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 29 - RB', SE, Corner El. - 19'-6"

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M. Ballard
Date: 8/5/83
Rev. 0
Checked by: H. Rahm
Date: 9/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Containment Spray System					
a. Pumps 1-3 & 4	Off	Pumps cannot function.	None. Control and Power to redundant Train 1 is also lost due to wall failures in the Control Room and 480 V Swgr. Room.	Train 2 of system is lost.	Containment Spray system is failed. In addition, Core Spray cannot be utilized for long term cooling. Flooding and radioactive release to the secondary containment will result.
b. Pump 1-3 & 4 Associated suction and discharge piping and valves	Rupture	Pump suction from Torus, Torus will drain.		Torus may be emptied.	
Corner Room Sump	Off	Flooding	None	None. Sump not operable	
Area Cooler	Off	Not required, Containment Spray Train 2 not operational.	None	None	
Terminal Boxes TB-21-1935 TB-22-648 TB-22-542	Off	None. Sump and Containment Spray not operable.	None	None	

Job No. 0370-043-1671
Prepared by: M. Bolan
Date: 8/3/93 Rev. 0
Checked by: [illegible] Date: 9/13/93

Concrete Wall Identification: 30 - RB', SE, Corner El. (-)19'-6"

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Containment Spray System a. Heat Exchanger 1-4 b. Heat Exchanger Piping		See Wall 33 for details.			

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 31 - RB', SE, Corner El. 23'-6"

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M. Ballard
Date: 8/5/85
Checked by: [illegible]
Rev. 4
Date: 9/12/13

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
MCC DC-1		See Wall 32 for Details			
Containment Spray Piping and Instrumentation		See Wall 33 for Details			

WALL FAILURE C[illegible]ENCE ANALYSIS

Concrete Wall Identification: 32 - RB', SE, Corner El. 23'-6"

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M. Galland
Date: 8/5/83 Rev. 0
Checked by: [illegible] Date: 8/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
MCC DC-1	On	Emergency Condenser inlet valves V-14-31 and 33 to NE01A & B are energized and fail closed. NE01A outlet va. V-14-34 fails closed.	None. Control of Valves is lost.	Auto control of the Emergency Condenser system is failed.	System may be utilized for long term reactor cooling if valves can be manually operated.
		Shutdown cooling inlet vas. V-17-1, 2, 3 outlet Vas. V-17-55, 56, 57 normally closed, fail closed.	None. Control of Valves is lost.	Auto control of the shut down cooling system is lost.	System may not be utilized for long term reactor cooling. Pumps are also lost due to Swgr Room wall failure.

WALL FAILURE CONSEQUENCE ANALYSIS

Job No. 0370-043-1671
Prepared by: M Ballard
Date: 8/5/83 Rev. 0
Checked by: J Pelan Date: 8/12/83

Concrete Wall Identification: 33 - RB', SE, Corner El. 23'-6"

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Containment Spray System					
a. Heat Exchanger 1-3 and 4	Rupture	Primary Containment Integrity is breached.	None. Control and power to redundant Train 1 is also lost due to wall failures in the Control Room and 480V Swgr. Room.	Train 2 of system is lost.	Containment cannot be isolated and Containment Spray System is failed. However, is only required for LOCA conditions.
b. Heat Exchanger Piping	Rupture	Primary Containment Integrity is breached.			
c. DPT-1P-05 C&D	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
d. FT-1P03B	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
e. TS-1P18B	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
f. TS-40C	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
g. Radiation Monitoring Instrumentation	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
Emergency Service Water Piping	Rupture	Loss of ESW to Containment Spray Heating Exchange 1-3 & 4		No effect as Train 2 of Containment Spray is failed.	

Job No. 0370-043-1671
Prepared by: M. Gallant
Date: 8/15/83 Rev. 0
Checked by: B. Robinson Date: 1/12/83

Concrete Wall Identification: 1 - Control Room
System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
14XR	Disabled	Loss of Meteorological Recording Instrumentation.	None	None	None. Not required for Plant Shut Down.
14R	Disabled	Main Steam System Valve Indication Lost.	None	None	None. Not required for Plant Shut Down.
13R	Disabled	Turbine Generator Monitor Instrumentation failure.	None	None	None. Not required for Plant Shut Down.
12XR	Disabled	Loss of Recording and Indication for Turbine Generator Drywell parameters.	None	None	None. Not required for Plant Shut Down.
9XR	Disabled	Loss of Recording for Turbine Metal Temperature and Torus Level.	None	None	None. Not required for Plant Shut Down.
11R	Disabled	Loss of gas treatment and HVAC Controls.	None	None	None. Not required for Plant Shut Down.
10R	Disabled	Loss of Indication and Alarms for Core Spray, Containment Spray, and SD Cooling.	None	None	None. Not required for Plant Shut Down.
9R	Disabled	Loss of Indication and Alarms for Feed Water and Recirculation System.	None	None	None. Not required for Plant Shut Down.

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 2 - Control Room

System Affected: As Listed Below

Job No. 0370-043-1691
Prepared by: M Bellair
Date: 5/5/93 Rev. 0
Checked by: D. Kuhn Date: 5/12/93

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
15R	Disabled	VMS Control Cabinet Lost.	None	None	None. Not required for Plant Shutdown.
16R	Disabled	Recorder Panel for H_2 and O_2 in Drywell.	None	None	None. Not required for Plant Shutdown.
11XR	Disabled	Turbine Generator Indicators Lost.	None	None	None. Not required for Plant Shutdown.
4R	Disabled	TIP Channels 1-4 Controls Lost.	None	None	None. Not required for Plant Shutdown.
3F	Disabled	Cleanup and Recirculation Controls Lost.	None	None	None. Not required for Plant Shutdown.
12F	Disabled	Plant Electrical Dist. System Status, Controls, and Relays Lost.	None	None	None. Not required for Plant Shutdown.
1R/2R	Disabled	Loss of Process, and Area Radiation Monitoring.	None	None	None. Not required for Plant Shutdown.
6R/6XR	Disabled	RPS Channel No. 1 Lost.	RPS Channel No. 2 Lost (Panel 7R) when Wall 16 fails.	Loss of 2 RPS Channels.	RPS designed fail safe. Reactor scram will occur on loss of power.
3R/5R	Disabled	Neutron Monitoring Lost. APRM & LPRM Monitoring Lost	None	Both Trains disabled.	Indication of power level is needed to monitor the core during shut down.

Job No. 0370-053-1671
Prepared by: M Ballard
Date: 1/5/83 Rev. 0
Checked by: [redacted] Date: 1/12/83

Concrete Wall Identification: 2 - Control Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
1F/2F	Disabled	Loss of shut down system controls: Containment Spray Core Spray Emergency Cond. Comp. Cooling Water SD Cooling	None	Normal Control for both trains lost.	Plant Shutdown from inside the Control Room is not possible.
4F	Disabled	Loss of control rod selector, control, and indication.	None	Normal Controls Lost.	Plant Shutdown from inside the control room is not possible.
17R	Disabled	Loss of Reactor Level Indication.	None	Loss of Indication of Reactor Wide Range Level.	Reactor Wide Range Level Data not available.

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 3 - Control Room

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: [illegible]
Date: 8/3/83 Rev. 0
Checked by: [illegible] Date: 8/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
10XF	Disabled	See Wall 5 for Details			
10F	Disabled	See Wall 5 for Details			
11F	Disabled	See Wall 5 for Details			
1F/2F	Disabled	See Wall 2 for Details			
1R/2R	Disabled	See Wall 2 for Details			
12F	Disabled	See Wall 2 for Details			
11R	Disabled	See Wall 5 for Details			

Concrete Wall Identification: 4 - Control Room

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M. Ballard
Date: 8/3/83 Rev. 0
Checked by: M P. Dunn Date: 9/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Cable Panels					
17R	Disabled	See Wall 2 for Details			
16R	Disabled	See Wall 2 for Details			
11XR	Disabled	See Wall 2 for Details			
12R	Disabled	Loss of Generator Output Indicators.	None	None	None. Not required for plant shutdown.
12XR	Disabled	See Wall 1 for Details			
13R	Disabled	See Wall 1 for Details			
14R	Disabled	See Wall 1 for Details			

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 5 - Control Room

System Affected: As Listed Below

Job No. D370-043-161
Prepared by: Michael F Bullard
Date: 8/5/83 Rev. 0
Checked by: Gregory T Robinson Date: 9/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Communications	Disabled	Loss of Emergency Telephone to NRC, County, News, etc.	None	None	None. Not required for plant shutdown.
Control Panels					
10XF	Disabled	Loss of Recombiners and Offgas System Controls.	None	None	None. Not required for plant shutdown.
10F	Disabled	Loss of area and vent radiation monitors.	None	None	None. Not required for plant shutdown.
11F	Disabled	Loss of Containment Isolation Valve Manual Control and Indication.	Valves should be isolated automatically if RPS functions properly.	Manual Valve Operation from the Control Room is not possible.	Manual Valve operation may be possible at the valve or local panels in the plant.
12F	Disabled	See Wall 2 for Details			
11R	Disabled	Loss of Containment Ventilation	Loss of Drywell Recirculation Fans.	Operation of Fans from Control Room is not possible.	Operation of Fans may be possible from MCC in 460V Switchgear Room by Electrical Bypassing Control Room operation. New remote shutdown panel could provide this option.

WALL FAILURE CO[illegible]NCE ANALYSIS

Concrete Wall Identification:	6 - Control Room
System Affected:	As Listed Below

Job No.	0372-243-1671
Prepared by:	M. Bellard
Date:	8/5/83
Checked by:	[signature]
Rev.	0
Date:	8/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
8F/9F	Disabled	Loss of Diesel Generator Instrumentation & Controls.	None	Unable to monitor control and indication	Control and monitoring of the diesel generators not possible
7F	Disabled	Main Steam and Turbine Generator Controls not available.	None	System not required.	None. Turbine will be tripped.
5F/6F	Disabled	Loss of Status and Controls for Feedwater and Steam.	None	System not required.	None. Turbine will be tripped.

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 7 - Control Room

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M Ballard
Date: 8/5/83 Rev. 0
Checked by: J Rolm Date: 8/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
9XF	Disabled	Loss of Indication and Controls for Station Batteries, Chargers, and Emergency Diesel Generator No. 2.	None	Battery Stations A & B are lost due to Wall 17 & 18 failures in Battery Room. Diesel Generators will start automatically if RPS functions.	See Wall 17 & 18 for effect of Battery Station A & B failure.
8F/9F	Disabled	Loss of Main Generator and Auxiliary Power Controls and Indication.	None	Unable to monitor control and indication.	Control and Monitoring of the Diesel Generators not possible.
11R	Disabled	Loss of gas treatment and HVAC Controls.	None	None	None. Not required for Plant Shutdown.

WALL FAILURE CO[illegible]NCE ANALYSIS

Concrete Wall Identification:	8 - Office Building El. 46'-6"
System Affected:	As Listed Below
Job No.	0370-043-1271
Prepared by:	M. Ballard
Date:	8/5/83
Checked by:	[illegible]
Rev.	0
Date:	8/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Vital Lighting Panels VLP 1 & LP-4	Off	Loss of Lighting to Control Room Cable Spreading Room, and Swgr. Room	Emergency or Portable Lighting would be utilized.	None	None

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 15 & 42 Office Building - 3rd Floor

System Affected: As Listed Below

Job No. 0377-043-K-1
Prepared by: M. Ballard
Date: 8/5/13
Checked by: JJ Rahn
Rev.
Date: 8/13/13

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Ventilation Duct Cables and Trays	Off	Loss of Area Cooling.	None	None	None

Concrete Wall Identification: 16 - Control Room

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M. Baker
Date: 1/5/93 Rev. 0
Checked by: J. Rehm Date: 1/12/93

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Control Panels					
4F	Disabled	See Wall 2 For Details			
5F/6F	Disabled	See Wall 6 For Details			
3R	Disabled	See Wall 2 For Details			
4R	Disabled	See Wall 2 For Details			
5R	Disabled	See Wall 2 For Details			
6R/6XR	Disabled	See Wall 2 For Details			
7F	Disabled	See Wall 6 For Details			
7R	Disabled	RPS Channel No. 2 Lost	RPS Channel No. 1 Lost (Panel 6R) when Wall 2 fails.	Loss of 2 RPS Channels	RPS designed fail safe Reactor Scram will occur on loss of power.
8R	Disabled	Reactor Temperature Indication.	Loss of Temperature Recorders.	Loss of Recirculation Pump Temperature Indication.	None. Not required for plant shutdown.
9R	Disabled	See Wall 1 For Details	None	None	None

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 17 & 18 Office Building Battery Room

System Affected: As Listed Below

Job No. 2370-243-J671
Prepared by: M. Ballard
Date: 8/4/83
Checked by: [illegible]
Rev. 2
Date: 8/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Main Battery Station A & B	Off	Loss of 125 VDC Power from Batteries "A" and "B"	Battery "C" is available	Battery "C" is D-C source for Division "A" safety related redundant loads.	DC power is available to Division "A" safety systems. DC power for 4160V SWGR 460V unit substation pump breakers. Note that Division "A" includes the unaffected train of containment spray which could be used with either train of core spray if these systems are available.
Rotary Inverter AC Motor, Panel and T.B. 21-1871	Off	Loss of AC Power to Continuous Instrumentation Panel No. 3.	Redundant train may be available.		

WALL FAILURE CONS[illegible]E ANALYSIS

Job No. 0370-043-1671
Prepared by: M. Ballard
Date: 7/5/83 Rev. 0
Checked by: [illegible] Date: 8/12/83

Concrete Wall Identification: 19 & 20 Office Building Electrical Tray Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Ventilation Duct	Off	Loss of Area Cooling.	None	None	None
Voltage Stabilizing Transformer	Off	Function Undetermined.			
Cables and Trays				Contains Reactor Building Shutdown Circuits.	

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 21, 22, & 23 Office Building 480V Swgr. Room

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M Ballard
Date: 9/5/03 Rev. 0
Checked by: J Rohr Date: 9/12/03

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Switchgear Unit Substation USS 1A2 and 1B2	Off	Loss of 480 V Power to both trains of Containment Spray Pumps Shutdown Cooling Pumps RBCCW Pumps CRD Feed Pumps Core Spray Booster Pumps Building Exhaust Fans Loss of Power to Vital Motor Controls Centers MCC-1A24 -1A2, 1B2 -1B21, 22, 1B21A, B -1A21, 22, 1A21A, B -1A23 -1A24 -1B24 -1B2B Lighting Dist. Pnls A2 & B2 Main Breaker 1A2M, 1B2M Tie Breaker Auxiliary Power Panel	None	None. Both Redundant Trains of essential systems lose power.	Normal shutdown systems not available to remove decay heat and maintain reactor level. Feedwater and Turbine bypass may be used if offsite power is available (if control is available from outside control room)
Swgr. Room HVAC	Off	Loss of Swgr. Room Cooling	None	Not required since all equipment is assumed lost.	None
MCCs - 1A2, 1A21 - 1B21	Off	Enveloped by USS 1A2 & 1B2 Failure.			
Panels ER-8A ER-18A	Off	Enveloped by USS 1A2 & 1B2 Failure.			
125VDC-F	Off	Loss of D.C Train A Circuits.			

WALL FAILURE CON[illegible]CE ANALYSIS

Job No.	0370-043-1671
Prepared by:	[illegible]
Date:	8/5/83
Rev.	0
Checked by:	[illegible]
Date:	8/12/83

Concrete Wall Identification: 21, 22, & 23 Office Building 480V Swgr. Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Instrument Panels IT-3, IT-4, IT-4A, B, C	Off	Enveloped by USS 1A2 & 1B2 failure.			
Instrument Panels 3 & 4	Off	Enveloped by USS 1A2 & 1B2 failure.			
Transformer IT-3, IT-4A, B	Off	Enveloped by USS 1A2 & 1B2 failure.			
Terminal Boxes A, B, F	Off	Enveloped by USS 1A2 & 1B2 failure.			
		failure.			

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 24 - Turbine Building NE Corner

System Affected: As Listed Below

Job No. 0376-043-1671
Prepared by: M. Ballard
Date: 9/5/93 Rev. 0
Checked by: G. Rahm Date: 9/12/93

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Emergency Service Water Piping					
a. 14" SW-2	Rupture	ESW to Containment Spray Heat Exchanger 1-1 & 1-2	None	Train 2 of Containment Spray System cannot operate. However, Train 2 is already disabled by failure of walls 29, 30, 31, and 33.	Train 1 remains intact.
b. CRD Pipe	Rupture	Condensate Storage Tank Water to CRD Lost.	None	Loss of CRD makeup to Reactor Vessel capability	

Job No. C377-043-1671
Prepared by: M. Ballard
Date: 8/5/83 Rev.
Checked by: J. Cahn Date: 8/12/83

Concrete Wall Identification: 25 - Office Building Cable Spreading Room

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Reactor Protection System					
a. Batteries Pilot Cell	Off	Loss of DC Power to Control Room Panels: - 1R Liq. Process Rad. - 2R Area Rad. Monitor - 3R Neutron Monitoring Sys - 5R Neutron Monitoring Sys	None. Both DC Channels Lost.	Nuclear Instrumentation Input to RPS is disabled. Loss of all DC power is assumed to generate a reactor scram.	None. Reactor Scram will occur on interruption of power to RPS.
b. Battery Chargers	Off				
c. 24 DC Power Panel B	Off				
d. Motor Generator Set 1-2 Control Cabinet	Off	Loss of normal AC Power to RPS Panel 2		Loss of single power source initiates a channel trip.	
e. Terminal Boxes TB-21-1421, TB-21-1860	Off	MG 1-1 and 1-2 Controls loss of normal AC power to RPS.		Loss of all AC power to the RPS results in a reactor scram.	

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 29 - RB', SE, Corner El. - 19'-6"

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M. Ballard
Date: 8/5/83 Rev. 0
Checked by: H. R. Date: 9/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Containment Spray System					
a. Pumps 1-3 & 4	Off	Pumps cannot function.	None. Control and Power to redundant Train 1 is also lost due to wall failures in the Control Room and 480 V Swgr. Room.	Train 2 of system is lost.	Containment Spray system is failed. In addition, Core Spray cannot be utilized for long term cooling. Flooding and radioactive release to the secondary containment will result.
b. Pump 1-3 & 4 Associated suction and discharge piping and valves	Rupture	Pump suction from Torus, Torus will drain.		Torus may be emptied.	
Corner Room Sump	Off	Flooding	None	None. Sump not operable	
Area Cooler	Off	Not required, Containment Spray Train 2 not operational.	None	None	
Terminal Boxes TB-21-1935 TB-22-648 TB-22-542	Off	None. Sump and Containment Spray not operable.	None	None	

Job No. 0370-047-167I
Prepared by: M. Baldwin
Date: 8/3/23 Rev. 0
Checked by: [illegible] Date: 9/12/23

Concrete Wall Identification: 30 - RB', SE, Corner El. (-)19'-6"

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Containment Spray System					
a. Heat Exchanger 1-4		See Wall 33 for details.			
b. Heat Exchanger Piping					

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 31 - RB', SE, Corner El. 23'-6"

System Affected: As Listed Below

Job No. 0370-043-1671
Prepared by: M. Ballard
Date: 8/5/83
Rev. 0
Checked by: [illegible]
Date: 9/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
MCC DC-1		See Wall 32 for Details			
Containment Spray Piping and Instrumentation		See Wall 33 for Details			

Job No. 0370-0437/171
Prepared by: M. Gallant
Date: 8/5/93
Checked by: [illegible]
Rev. 0
Date: 8/12/93

Concrete Wall Identification: 32 - RB', SE, Corner El. 23'-6"

System Affected: As Listed Below

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
MCC DC-1	On	Emergency Condenser inlet valves V-14-31 and 33 to NE01A & B are energized and fail closed. NE01A outlet va. V-14-34 fails closed.	None. Control of Valves is lost.	Auto control of the Emergency Condenser system is failed.	System may be utilized for long term reactor cooling if valves can be manually operated.
		Shutdown cooling inlet vas. V-17-1, 2, 3 outlet Vas. V-17-55, 56, 57 normally closed, fail closed.	None. Control of Valves is lost.	Auto control of the shut down cooling system is lost.	System may not be utilized for long term reactor cooling. Pumps are also lost due to Swgr Room wall failure.

WALL FAILURE CONSEQUENCE ANALYSIS

Concrete Wall Identification: 33 - RB', SE, Corner El. 23'-6"

System Affected: As Listed Below

Job No. 0370 - 043 - 1671
Prepared by: M Ballard
Date: 8/5/83 Rev. 0
Checked by: J Palmer Date: 8/12/83

Component Name and Number	Failure Mode	Symptoms and Local Effects Including Dependent Failures	System Inherent Compensating Provision	Summary: Effect Upon System	Summary: Effect Upon Plant Performance
Containment Spray System					
a. Heat Exchanger 1-3 and 4	Rupture	Primary Containment Integrity is breached.	None. Control and power to redundant Train 1 is also lost due to wall failures in the Control Room and 480V Swgr. Room.	Train 2 of system is lost.	Containment cannot be isolated and Containment Spray System is failed. However, is only required for LOCA conditions.
b. Heat Exchanger Piping	Rupture	Primary Containment Integrity is breached.			
c. DPT-1P-05 C&D	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
d. FT-1P03B	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
e. TS-1P18B	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
f. TS-40C	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
g. Radiation Monitoring Instrumentation	Off	Loss of Instrumentation.		Not required because Train 2 is assumed to fail.	
Emergency Service Water Piping	Rupture	Loss of ESW to Containment Spray Heating Exchange 1-3 & 4		No effect as Train 2 of Containment Spray is failed.	

Report No. 02-0370-1132
Revision 0

APPENDIX D

EQUIPMENT LISTS

0	MFB	6/6/83	ST	6-9-83	IMPELL CORPORATION	JOB NO	PAGE
REV	BY	DATE	CHECKED	DATE		CALC NO	OF

CALCULATION/PROBLEM COVER SHEET

Calculation/Problem No: 0370-043-01

Title: Masonry Wall Failure-Plant Walkdown Results

Client: GPUNC **Project:** Oyster Creek NGS

Job No: 0370-043-1671/1641

Design Input/References:

1. GPU Specification No. SP 1302-53-11, Rev. 0
2. EDS Proposal B/P No. 37-106, Rev. 1

Assumptions:

1. Equipment hit by walls are assumed to fail.
2. Equipment on both sides of the wall are listed (i.e., wall could fail in either direction).
3. As delineated in Reference 1 and 2.

Method:

A plant walkdown was conducted to determine which equipment (piping, components, cable trays, etc.) is affected by the concrete block wall failures detailed in Reference 1. The tables are included herein.

Remarks:

None

REV. NO.	REVISION	PERFORMED BY	CHECKED	APPROVED	DATE
0	Original Issue	M. F. Ballard	E. Y. Sang		6/9/83

S 0004 578

WALL NO. 1

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Control Panels	
14XR	o Meteorological Recording Instrument
14R	o Position Indication for: Main Steam Bypass Valves Main Steam Stop Valves Main Steam Control Valves Main Steam Intercept Vas.
	o Turbine Speed Eccentricity Recorder
13R	o Controls for: FW Heater Vent Valves Main Steam Drain Valves Pond Pump Controls
	o Circulating and Feed Water Temperature Recorder
	o HP Exhaust Reheat and IP Exhaust Pressure Instruments
12XR	o Recorder for: Generator Temperature Transformer Temperature Drywell Pressure
	o Dilution Plant Controls
	o Drywell and Torus N_2 and Sample Valve Controls

WALL NO. 1

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Control Panels	
9XR	o See wall 7 for details
11R	o See wall 7 for details
10R	o Indication and Alarms for: Core Spray System Containment Sprays System Shutdown System Reactor Water Cleanup System
9R	o Indication and Alarms for: Main Steam System Feedwater System Turbine Generator System

WALL NO. 2

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Control Panels	
15R	o VMS Control Cabinet
16R	o Recorder Panel for H_2 and O_2 in Drywell
6R	o Reactor Protection System Recording and Test Switches
11XR	o See wall 4 for details
5R	o Recirculation System Alarms and Recording
	o APRM and LPRM Alarms, Recording and Calibration
4R	o Traversing In-Core probe (TIPS) Channels 1, 2, 3 and 4 Alarms and Controls
3R	o APRM and LPRM Calibration, Indication, and Controls
1F	o See wall 3 for details
2F	o See wall 3 for details
3F	o Reactor Water Cleanup System Controls
	o Recirculation System Pumps A, B, C, D, Controls, Indications, and Trips
6XR	o Protection Operations Panel
12F4, 5, 6, 7, 8	o See wall 3 for details

WALL NO. 2

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Control Panels	
1R	o Radiation Monitors for: Service Water Discharge Steam Line Radioactive Waste Discharge Stack Gas Off Gas CCW Discharge o Auxiliary Trip Relay Monitor
2R	o Indication and Trip units for: Fuel Pool Filter Shutdown Heating Exhaust CRD Module Spent Fuel Pool Area Liquid Poison System Area Containment Spray Heating Exhaust Effluent Vent Manifold Radiation Monitor
4F	o Controls Rod Selector, Control, and Indication
17R	o Reactor Wide Range Level Instrumentation

WALL NO. 3

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Control Panels	
10XF	o See wall 5 for details
10F	o See wall 5 for details
11F	o See wall 5 for details
12F-1,2, 3	o See wall 5 for details
1F & 2F	o System Indication, pump and valve controls for: Containment Spray Systems 1 and 2 Emergency Condensor Systems 1 and 2 Component Cooling Water Systems 1 and 2 Shutdown Cooling Systems 1 and 2
1R	o See wall 2 for details
2R	o See wall 2 for details
Beta Monitor 12F-4, 5, 6, 7, 8	o Plant Electrical Distribution System Status, Controls, and Relays

WALL NO. 4

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Control Panels	
17R	o Reactor Wide Range Level Indication
16R	o Recorder Panel for H_2 and O_2 Concentration in Drywell
11XR	o Generator Indicators
12R	o Generator Output Indicators
12XR	o See wall 1 for details
13R	o See wall 1 for details
14R	o See wall 1 for details
Cabinet JC 19129	

WALL NO. 5

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Telephones	o Emergency Response to NRC, County, State Police, News, etc.
Control Panels	
10XF	o Recombiner and Off Gas System
	o Emergency Control Phones
10F	o Area and Ventilation Radiation Monitors
11F	o Containment Isolation Valve Status and Controls
	o Torus Level Indication
12F-1, 2, 3	o Plant Electrical Distribution System Status, Controls, Relays

WALL NO. 6

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Fire Protection Instrument Panel	
Control Panels	
8F/9F	o Main Generator Instrumentation
7F	o Main Steam and Generator Controls: Main Stop Valve Reheat Valve Bypass Valve Steam Seal Regulator Steam to RHR
5F/6F	o System Status and Controls for: Main Steam System Feedwater System Condensate System Circulation Water System Feedwater Heaters

WALL NO. 7

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Fire Protection Instrument Panel	
Control Panels	
9XF	o Indication and Controls for Batteries, Chargers and Emergency Diesel Generator No. 2
8F/9F	o Main Generator, Station Auxiliary Controls and Indication
9XR	o Turbine Bearing Metal Temperature and Torus Level Recording
11R	o HVAC Indication and Controls for: Turbine Building Control Room, etc.
	o Drywell Purge Indication and Controls

WALL NO. 5, 6, 7

LOCATION: COMPUTER ROOM (Formerly Observation Deck)

COMPONENT	FUNCTION
Sigma 3 Computers and Associated Cables	o LPRM, APRM, TIP Process Computer o Scans, Rod Position for Display o Plant Parameters Processed for Heat Balance Analysis

WALL NO. 8

LOCATION: OFFICE BUILDING EL. 46'-6"

COMPONENT	FUNCTION
Cable Trays	o 1
	o 10
	o 11
	o 12
	o 13
	o 14
Vital Lighting Panels VLP-1 & LP-4 Conduit	o To Control Room, Cabinet Spray Room, Swgr Room
Communication Terminal Panels	
Fire Protection Station	
Power Panel MP-1D	o Misc.
Panels 16-1, 16-6	
2 Voltage Regulators	

WALL NO. 15

LOCATION: OFFICE BUILDING - 3rd FLOOR

COMPONENT	FUNCTION
Cable Tray	o 14A
	o 13A
Conduit	o Attached to wall
Fire Protection Alarm Panel	

WALL NO. 16

LOCATION: CONTROL ROOM

COMPONENT	FUNCTION
Control Panels	
4F	o See wall 2 for details
5F/6F	o See wall 6 for details
3R	o See wall 2 for details
4R	o See wall 2 for details
5R	o See wall 2 for details
6R	o See Wall 2 for details
6XR	o See wall 2 for details
7F	o See wall 6 for details
7R	o Protection Panel Channel 2
8R	o Recirculation Pump Temperature Indication
9R	o Feed Water and Recirculation Panel

WALL NO. 17

LOCATION: OFFICE BUILDING BATTERY ROOM AND MECH. EQUIP. ROOM NO. 2

COMPONENT		FUNCTION
Rotary Inverter AC Motor	o	AC Power Supply from Vital MCC 1B2 with alternate DC Power feed from 125VDC Ctr B (B Battery) for the continuous Instrument Panel No. 3
T.B. 21-1871	o	For Rotary Inverter
Rotary Inverter Panel	o	Power and Control
Vent	o	Area HVAC
Emergency Lighting	o	For Battery Room
Conduits	o	Feeding Cable Trays 23, 24, 25, 26
Hot Water Tank		
Halon Fire Suppression		
Vent Blower Motor EF-1-18 and Associated Duct Work		

WALL NO. 18

LOCATION: OFFICE BUILDING BATTERY ROOM

COMPONENT	FUNCTION
Main Battery Station A & B	o Plant DC Power Supply 125 VDC Dist. Ctrs. A & B
Area Lighting	
Conduit 1	o To Dist. Panel A & B, Battery Charger A & B, MG Sets A & B

WALL NO. 19 and 20

LOCATION: OFFICE BUILDING ELECTRICAL TRAY ROOM

COMPONENT	FUNCTION
Cable Trays	o 15
	o 16
	o 17
	o 18
	o 19
	o 20
	o 21
	o 22
	o 23
	o 24
	o 25
	o 26
Voltage Stabilizing Transformer	o Function Undetermined
Unidentified Cable Tray on South Wall	o Listed during walk-down and shown on dwg. 3160 but not on S&W dwg. No. 13432.42 App. R pg. 15 of 23
Vent	o Area HVAC

WALL NO. 21

LOCATION: OFFICE BUILDING SWITCH GEAR ROOM

COMPONENT	FUNCTION
Ventilaton Ducts	o Swgr Room HVAC
Swgr USS 1B2 Power Cabinets	o Containment Spray PP 1-4
	o SD Cooling PP NU02C
	o RBCCW PP 1-2
	o Containment Spray PP 1-3
	o MCC 1B2B
	o CRD Feed PP NC08B
	o Vital MCC-1B
	o MCC-1B21
	o MCC-1B22
	o Ltg Dist. Panel B2
	o Building Exhaust Fan F-1-6
	o SD PP NU02B
	o Core Spray Booster PPs NZ03B, C
	o Auxiliary Power Panel
	o Main Breaker 1B2M
	o MCC-1B24
Cable Tray V-30	

WALL NO. 21

LOCATION: OFFICE BUILDING SWITCH GEAR ROOM

COMPONENT		FUNCTION
Motor Control Ctrs	o	1B21
Panels 16-8 50-2 49-2	o	Power for Swgr Room Area and Access Door
Cable Trays	o	15A
	o	16C
	o	19D

WALL NO. 22

LOCATION: OFFICE BUILDING SWITCH GEAR ROOM

COMPONENT		FUNCTION
Swgr USS 1B2 Power Cabinets	o	See Wall 21 for details
Duct Work	o	Ventilation System
Cable Trays	o	15A
	o	15C
Swgr USS 1A2 Power Cabinets	o	Main Breakers 1A2M
	o	Tie Breaker
	o	Containment Spray PPs 1-1 and 1-2
	o	SD Cooling PP NU02A
	o	RBCCW PP 1-1
	o	MCC-1A24
	o	CRD Feed PP NC08A
	o	Vital MCC-1A
	o	MCC-1A21
	o	MCC-1A22
	o	Ltg Dist Panel A2
	o	Building Exhaust Fan EF-1-5
	o	MCC 1A23
	o	Core Spray Booster PPs NZ03A, D

WALL NO. 23

LOCATION: OFFICE BUILDING SWITCH GEAR ROOM

COMPONENT		FUNCTION
Swgr USS 1A2 Power Cabinets	o	See wall 22 for details
Vital MCC 1A2		
Panels ER-8A	o	Containment Spray System 1
ER-18A	o	Core Spray I, Channel A; ADS Feeder 1
	o	Core Spray I, Channel C; ADS Feeder 2
Cable Trays	o	15
	o	16
125VDC-F	o	DC Power Supply
Auto Transfer Switch IT3, IT4	o	Alternate AC Supply use to instrument Panel 3; Instrument Panel 4
IT-3 IT-4, 4A, B, C	o	Instrument Panels
Instrument Panels 3 and 4	o	Power to Intrumentation
Transformer IT-3 IT-4A, B	o	Power Stepdown Transformers to Instrument Panels
Terminal Boxes A, B, F	o	Core Spray PP Control
Ventilation Duct	o	Swgr Room HVAC

WALL NO. 24

LOCATION: TURBINE BUILDING NE CORNER EL. 0'-0"

COMPONENT		FUNCTION
Piping		
1) NC	o	CRD System from CST
2) Fire Protection	o	To Turbine Building Hose Station
3) Insulated Pipes	o	Emergency Service Water to Containment Spray Heat Exchange 1-1 and 1-2
Conduit	o	Unidentified
Cable Trays 7, 8, 9	o	Unidentified
Turbine Building Oil Station		

WALL NO. 25

LOCATION: OFFICE BUILDING CABLE SPREADING ROOM

COMPONENT		FUNCTION
Cable Trays AT AM AB BT BM BB		
Batteries-Pilot Cell	o	Reactor Protection System (RPS)
Battery Chargers B-1, B-2	o	Reactor Protection System (RPS)
TB-21-1421	o	M-G 1-2 Controls
1860	o	M-G 1-1 Controls
Motor Generator Set 1-2 Control Cabinet	o	RPS
Protection System Panel #2	o	RPS
24DC Power Panel B	o	RPS

WALL NO. 29

LOCATION: REACTOR BUILDING SE CORNER EL. - 19'-6"

COMPONENT		FUNCTION
Containment Spray Pumps 1-3 and 1-4	o	Train 2 of Containment Spray System
Containment Spray Pumps 1-3 and 1-4 Suction and Discharge Piping and Isolation Valves	o	Train 2 of Containment Spray System
SE Corner Room Area Cooler	o	Train 2 of Containment Spray System
SE Corner Room Sump Pump 1-7	o	Reactor Building Drain
Terminal Boxes		
TB-21-1935	o	Sump Pump Shutoff Valves V-24-35, 36 and L.S.
TB-22-648	o	Sump Pump Control and Sol Valve V-2-18
TB-22-542	o	Containment Spray Suction Valves V-21-1 and 3 Controls
Instrument Air Line		

WALL NO. 30

LOCATION: REACTOR BUILDING SE CORNER EL. - 19'-6"

COMPONENT	FUNCTION
Containment Spray Heat Exchanger 1-4	o Train 2 of Containment Spray System
Containment Spray System Piping and Valves	o Train 2 of Containment Spray System
Conduit	o Unidentified

WALL NO. 31

LOCATION: REACTOR BUILDING SE CORNER EL. 23'-6"

COMPONENT		FUNCTION
Motor Control Center DC1	o	See wall 32 for details
Vent Duct Work Sump	o	See wall 32 for details
Misc. Piping to SE Corner Room Sump	o	See wall 32 for details
Containment Spray Discharge Temperature and Flow Instrumentation	o	See wall 33 for details
1" Air Test Line to Containment Spray Heater Discharger Piping		
2 Torus Vents	o	Temporary for Outage
Duct Work	o	Reactor Building HVAC
Misc. Piping to SE Corner Room Sump	o	See wall 32 for details
Insulated Piping Floor Drain Piping	o	See wall 32 for details

WALL NO. 32

LOCATION: REACTOR BUILDING SE CORNER EL. 23'-6"

COMPONENT		FUNCTION
Motor Control Center DC1	o	Supplies power to: Main Steam Drain Valves Emergency Condenser Valves Reactor Water Cleanup Valves Shutdown Cooling Valves
Vent Duct Work	o	For SE Corner Room Sump
Misc. Piping to SE RB Corner Room Sump	o	Orange Piping Light Green Piping
Alarm Station	o	RB Equipment Hatch Crane Operation
Phone	o	Communications
Insulated Piping	o	To outside RB Assure Auxiliary Boiler Steam Piping
2 Torus Vents	o	Temperary for Outage

WALL NO. 33

LOCATION: REACTOR BUILDING SE CORNER EL. 23'-6"

COMPONENT		FUNCTION
Containment Spray Heat Exchangers 1-3 and 1-4	o	Train 2 of Containment Spray System
Containment Spray Heat Exchanger 1-3 and 1-4 Inlet and Outlet Piping	o	Train 2 of Containment Spray System
Emergency Service Water Piping to/ from Containment Spray Heat Exchangers 1-3 and 1-4	o	Train 2 of Containment Spray System
DPT-1P-05C, D	o	Differential Pressure between Shell and Tube side of Heat Exchanger 1-3 and 1-4 Transmitter to Annunciator Alarm at low shell/tube ΔP
FT-1P03B	o	Containment Spray Train 2 Flow, Pump Control
TS-1P18B	o	Containment Spray Discharge Temperature Train 2, Pump Control
TE-40C	o	Containment Spray Discharge Temperature Train 2, Recording
Radiation Monitoring Instrumentation	o	Containment Spray Heat Exchange 1-3 and 1-4 ESW Discharge Radiation Monitors

WALL NO. 33

LOCATION: REACTOR BUILDING

COMPONENT		FUNCTION
Duct Work	o	Reactor Building HVAC
Hose Station	o	Fire Protection System
Conduit-Large	o	Unidentified
Misc. Piping Light Green	o	Reactor Building Drains
Insulated Piping Routed to outside of Reactor Building	o	Assure Auxiliary Boiler Steam Piping

WALL NO. 42

LOCATION: OFFICE BUILDING - 3rd FLOOR

COMPONENT	FUNCTION
Cable Tray	o 14A
Vent	o Area HVAC
Fire Protection System Conduits	