Attachment No. 1 to JPN-85-38

Long-Term Pipe Support Inspection and Evaluation Program Plan

NEW YORK POWER AUTHORITY
James A. FitzPatrick Nuclear Power Plant
Docket No. 50-333

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POWER AUTHORITY OF THE STATE OF NEW YORK
JAMES A. FITZPATRICK NUCLEAR POWER PLANT
PIPE SUPPORT TASK FORCE
PROJECT PLAN

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I. INTRODUCTION

A. Background

In a petition dated and filed on September 12, 1983, the Union of Concerned Scientists (USC) made several allegations concerning the adequacy of pipe supports in the FitzPatrick plant. This petition essentially requested that FitzPatrick be shutdown until claims of visably damaged supports and incomplete or incorrect design calculations were resolved. The NRC denied UCS's petition finding no basis for their allegations.

During the inspection of several pipe supports to confirm or refute these allegations, several discrepancies were noted between the support drawings and the actual condition of the support. Most of these discrepancies concerned support weld. Further study concluded that none of the discrepancies have any generic safety implications.

A committee (The Pipe Support Task Force Committee) was formed by the FitzPatrick Resident Manager to identify and correct or evaluate similar discrepancies, with restoration to the original design preferable.

This program plan is one of the work products prepared by the Pipe Support Task Force Committee. This program plan describes the complete plan for investigating the current condition of pipe supports on safety-related piping and assuring that these supports comply with applicable installation criteria. This plan also describes the scope of the investigation; a program to repair or restore discrepant pipe supports; and a program to document both the investigation and any corrective actions necessary. After this plan has been completed and approved, the committee will prepare field procedures to implement the program.

B. Plan Summary

This section of the program plan will summarize the three fundamental phases of the pipe support task force program. These three phases are:

1. Inspection
2. Evaluation
3. Resolution of Discrepancies

Inspection

This is the first phase to be performed.

During the inspection phase, the as-found condition of pipe supports on safety-related piping will be compared with the JAF plant drawings. This comparison will include a number of attributes that are consistent with the level of inspection applied to recent work at JAF. Certain attributes that will not be inspected are specified and justified in Section III.

Discrepancies identified during the inspection will be documented and referred to a pipe support field engineer for evaluation and resolution.

Evaluation

The evaluation process itself is a two-step process involving an initial evaluation to determine whether support operability is affected and a final evaluation to determine the feasibility of support restoration.

If the result of the initial evaluation indicates the pipe support is functional, the final evaluation shall be performed. The final evaluation will describe the most feasible method for resolution of the discrepancies. Whenever conditions permit, pipe support will be restored to its original design condition. Should restoration be impractical, the pipe support will be referred for stress analysis.

Resolution of Discrepancies

As the result of the evaluation process, three means of resolving discrepancies are available to the pipe support field engineer; restoration, stress analysis, a combination of restoration and stress analysis.

Restoration is making those physical changes to the pipe support to make it conform with the existing design drawing. No changes to the design drawing will be necessary in this case.

Stress analysis will be used in those cases where restoration alone is impractical or not feasible. The "as-found" condition will be analyzed and compared to applicable design criteria. Should the "as-found" condition meet design criteria, drawings will be updated to reflect the "as-found" condition.

In those cases where restoration is not feasible and analysis has determined that the support fails to meet applicable design criteria, a combination of both may be the most practical means to resolve the discrepancies.

C. Implementation

This plan has been developed for implementation through normal Authority policies and several new detailed procedures that are identified below. Except for a small group of personnel dedicated to this project, work will be performed through "normal" channels (i.e. restoration of supports to be handled by the Maintenance Department, inspections to be conducted by the Quality Assurance Department, etc.).

Detailed procedures will be prepared for each phase of this program: inspection, evaluation, restoration, and analysis. These procedures will apply only to personnel assigned to the pipe support task force project.

This plan defines several key personnel positions or groups that form a minimum basis for the program.

- Project Manager
- Field Engineers
- Stress Engineers
- Quality Control Inspectors
- Maintenance Mechanics

These five positions will be dedicated to the implementation of this program. Other personnel such as a Quality Assurance Engineer, Radiological and Environmental Services, and Drafting personnel will be required on a part-time basis.

A preliminary program schedule is included in Section VII of the plan.

II. SCOPE OF PLAN

This program will emphasize the inspection of safety-related system pipe supports within the FitzPatrick Plant. In general, inspections will be limited to the following:

a) Safety-related piping with a size of 2 1/2 inches or greater (Appendix A).

b) Safety-related piping containing sizes smaller than 2 1/2 inches which normally forms part of the reactor coolant pressure boundary or is a small high energy line located in the secondary containment as defined in SWEC Document HELB Analysis (Appendix B).

c) Other piping designated for inspection due to additional regulatory requirements (Appendix C).

In general, the scope of this program is based upon NRC Bulletin No. 79-14 "Seismic Analyses for As-Built Safety-Related Piping Systems", as amended. Revision 1 to this Bulletin limits the scope of this bulletin to"...all safety-related piping 2 1/2 inches in diameter and greater and to seismic Category I piping, regardless of size which was dynamically analyzed by computer." A Show Cause Order issued by the NRC on March 13, 1979 specifically addressed only piping analyzed by computer programs. NRC Bulletin No. 79-07, "Seismic Stress Analysis of Safety-Related Piping" similarly involved only the seismic analysis of safety-related piping. The program also uses the guidance of NRC Bulletins 79-02, 79-07 and 79-14 to establish those elements of the pipe support which must be inspected.

Small high energy lines have been included based on the importance to plant operations and their potential effects on the operability of other safety-related equipment should they fail.

This program does not address safety-related piping measuring less than 2 1/2 inches in diameter that is not considered a high energy line and does not form part of the reactor coolant pressure boundary.

Appendicies A, B, and C list the piping systems or portions of systems that will be inspected under the plan. Specific piping line numbers from these systems will be listed in a separate document. The supports for these systems will be reviewed by comparison of the as-found support versus the support detail design drawing.

III. INSPECTION PROGRAM DESCRIPTION

It is recognized that the pipe supports to which this inspection program is applicable have been previously inspected. This pipe support inspection program will verify the details of the pipe support with the exception of the following items:

a. The location of supports that were not verified per NRC Bulletin 79-14 will be verified as part of this program.

b. The tightness of concrete anchor bolts will not be verified since this was performed per NRC Bulletin 79-02.

c. Pipe supports or portions of pipe supports that are determined to be inaccessible for inspection. Pipe supports that are not accessible for inspection shall be brought to the attention of the Pipe Support Field Engineer.

It is intended that the inspections will be conducted over a long term program by Quality Control Inspectors (QCI) from the JAF plant.

A schedule for performing the inspections will be outlined by the Pipe Support Project Manager based on plant operations and availability of project manpower. The schedule will be provided to the JAF Q.A. Superintendent via the JAF Resident Manager on a monthly basis. The Pipe Support Field Engineer (PSFE) shall have the responsibility of interfacing with the Mechanic Foreman for installation of lighting, ladders, scaffolding, etc., to provide accessibility for the inspections. When the pipe support is accessible, the PSFE will make a physical check of the support to determine if any other items will obstruct the QCI from inspection of the entire support. The Mechanic Foreman will be contacted by the PSFE if other items must be temporarily moved.

The QCI will then inspect the pipe support. A list of the inspection items will include, but is not limited to, the following:

1. Overall configuration of the pipe support structure.

2. Required clearances that permit or restrict movement.

3. Tightness of threaded fasteners except concrete anchors.

4. Piping welded attachments and welds.

5. Supplementary steel and component welds.

6. Spring hangers type, size and setting.

7. Hydraulic and mechanical snubber type, size, and setting.

8. Other component items type, size.

9. (If required) pipe support location.

Each inspection item will be documented by the QCI on a data report. Data reports for acceptable pipe supports will be forwarded to the PSFE for filing. Items found to be unacceptable by the QCI will be documented on a discrepancy report in accordance with the JAF Quality Assurance Program. The discrepancy report will be forwarded to the PSFE for

evaluation. A log of discrepancy reports will be maintained by the PSFE. The discrepancy report will be returned to the QCI only after the recommended corrective action is accomplished. The QCI will reinspect the support to assure that the corrective action has been accomplished and that the as-built condition meets the requirement of the JAF design drawing. Completed data reports will be forwarded to the PSFE for filing.

IV. EVALUATION PROGRAM DESCRIPTION

Inspected pipe supports that conform with the detail design drawing will not be evaluated. As stated above in the Inspection Program, a pipe support that has been determined to be non-conforming will have a discrepancy report initiated describing the specific details of the discrepancies and will be forwarded to the PSFE for evaluation and resolution.

After a discrepancy report is received by the PSFE, the affected support normally will be identified and located in the field, and the actual discrepancy will be confirmed by the PSFE.

The evaluation of the discrepancy shall be performed in two parts:

1. The PSFE shall determine the significance of the discrepancy affecting the pipe support's ability to perform its intended design function. If, through engineering judgement or simple field calculation, it is concluded that the affected pipe support is functional, the second step of this evaluation can be performed. If, however, a determination cannot be made with sufficient confidence or if the support's functional capability is questionable, the support shall be referred to the Pipe Support Stress Engineer for detailed analysis of support and system operability. If, as a result of the detailed operability analysis the piping system is determined not to be functional, then the plant may be placed on a limiting condition for operation (LCO) in accordance with the JAF Technical Specifications. The LCO should be factored into the evaluation and decision process to meet the time constraint for continued operation. Restoration of the support to its design condition or reanalysis of the support to provide acceptability are two methods that will create an acceptable condition and permit continued operation.

2. If the discrepancy does not significantly affect support function, a determination shall be made whether the support can be restored (by rework) to its design condition. Restoration is the preferred method for

support due to inaccessibility. In this case, a decision could be made to perform stress analysis of the support with the anticipation that the existing condition would still meet the design criteria. A third decision could result in obtaining an acceptable support by the combination of restoration and stress analysis.

The evaluation process is essentially complete at the time when a restoration package is assembled by the PSFE and is forwarded to restore the support to its original design condition or a request for stress analysis is initiated by the PSFE and is forwarded to the Pipe Support Stress Engineer to analyze accept specific identified discrepancies. Further evaluation may be required if the support cannot be restored or if the analytical results indicate that the discrepancies are not acceptable.

V. RESTORATION PROGRAM DESCRIPTION

After the PSFE has decided to restore a support, a pipe support restoration package will be initiated. The package will contain specific instructions (including requirements for temporary support) with a copy of the support drawing with deficient areas clearly marked. The package will also contain instructions to complete the restoration. The completed pipe support restoration package will then be reviewed and approved by the cognizant QA engineer. Upon QA approval, the PSFE will deliver the pipe support restoration package to the Installation Supervisor in charge of the mechanics-welders.

It will be the Installation Supervisor will ensure that the work outlined in the data package is completed. The Installation Supervisor's responsibilities will include all requirements for lighting, tooling, materials, temporary support, welding equipment and other miscellaneous equipment necessary to complete the work. The Installation Supervisor will be responsiblefor compiling the required data that it is accurate, and it is attached to the pipe support restoration package.

Upon completion of the restoration work, the Installation Supervisor will sign off the data package indicating that the restoration of the support has been complete. The Installation Supervisor will deliver the completed work package to the PSFE. The PSFE will review and concur with the package. The PSFE will resubmit the pipe support with the completed discrepancy report to the QCI for inspection as required by the Inspection Program.

VI. ANALYSIS PROGRAM DESCRIPTION

After the evaluation phase has been completed, stress analysis may be performed to verify support acceptability to the design standards. The PSFE will submit a request to perform stress anlaysis to the Pipe Support Stress Engineer (PSSE). The specific reasons for requiring stress analysis in lieu of restoration of the support will be stated in this request.

A discrepancy is "allowable" if it has been considered in the pipe suppcrt analysis and the calculated stresses are within the allowables of the design code specified in the JAF Final Safety Analysis Report. In this case, no physical modification of the support is required. The pipe support drawing, however, will be revised to reflect the as-built condition. The revised support design drawing will be returned to the PSFE with the completed request for stress analysis.

When the result of the analysis shows that the calculated stresses exceed the specified allowables, an interim operability analysis shall be performed in the following order:

1. Calculate the ultimate load capacity of the support based on ultimate material stress. If the ultimate load capacity is equal to or greater than two times the actual support load, the support is considered operable.

2. If the analysis performed in Item 1 does not confirm support operability, review the pipe stress anlaysis to check whether excessive conservatism was used in the analytical model, the thermal condition and the applicable amplified response spectrum. Piping reanalysis should be performed if applicable. The pipe support load resulting from the reanalysis will be used for further evaluation of its acceptability or operability.

3. If the analysis performed in Items 1 and 2 does not confirm the support operability, the piping system shall be reanalyzed. If the maximum pipe stress does not exceed 2.4 S_h and the adjacent supports are operable, the system is considered operable.

Although support or system operability may be verified by satisfying one of the above, the allowable stresses in the design code must be satisfied for support acceptability.

If as a result of this operability analysis, the system is still considered inoperable, the PSFE shall be immediately informed of this condition so that appropriate actions can be taken by plant management. After informing the PSFE of the condition, the PSSE will recommend a change to the support to establish an acceptable condition. The changes will be incorporated by a revision to the pipe support design drawing.

VII. MANPOWER AND SCHEDULES

The proposed schedule for implementing this pipe support program is based on inspecting the total number of supports identified in two phases if necessary. This would include inspecting/restoring all supports located in inaccessible areas of the plant (i.e. drywell) during two refueling outages.

The first phase will involve a sample inspection of 100 supports from various plant systems. The results of this inspection, in terms of the numbers and types of discrepancies found, will be reviewed and determined by plant management whether to conduct the second phase. The second phase would require the inspection of the remainder of the supports.

Stone and Webster has preliminarily estimated that 1750 supports will have to be inspected for completion of the program. It is further estimated that 1450 of the total supports could be inspected during plant operations.

The remaining 250 supports will be done during two 90-day refueling outages. This will require 10 supports to be done per week during refueling outages. The inspection/restoration should be closely coordinated with the ISI program. This will prevent duplication of insulation removal/scaffolding installation. The manpower available to perform inspections will have to be doubled during refueling outages at the minimum. Productivity will decline when working in the drywell due to high radiation exposure, confined work area and conflict with other ongoing work.

3-YEAR PROGRAM DURATION

PHASE I

Number of Supports - 100
Time Interval - 10 weeks
Number of Supports Per Week - 10

PHASE II

PLANT OPERATING (NON-OUTAGE)

Number of Supports - 1400
Time Interval - 2 years - 2 1/2 months
Number of Pipe Supports Per Week - 12

PLANT SHUT DOWN (OUTAGE)

Number of Supports - 250
Time Interval - 6 months (2-90 Day Outages)
Number of Supports Per Week - 10

Summary of Responsibilities

Project Manager

1. Pipe support program coordinator
2. Liaison between the Pipe Support Task Force and JAF-NYPA management.
3. Schedules, Finances, Budgets, Manloading

Pipe Support Field Engineer

1. Performs initial pipe support walkdown and initiates data reports.
2. Evaluates the effect of discrepancies on support operability.
3. Evaluates discrepancies to determine a resolution, either restoration or analysis.
4. Processes the required documentation to implement the resolution.
5. Coordinates the daily activities of the program.

Pipe Support Clerk

1. Maintains logs for all documentation initiated as a part of the program.
2. Maintains files for all completed and closed-out documents that are a part of the program.

Quality Control Inspector

1. Inspects existing supports per the design drawing and established criteria.

2. Issues data reports for accepted pipe supports.

3. Initiates discrepancy reports for unacceptable supports.

4. Reinspects supports upon restoration to the design drawing or upon analysis/drawing revision to meet the as-built condition.

Quality Assurance Engineer

1. Reviews various aspects of the program for compliance with the JAF Quality Assurance Program.

Pipe Support Stress Engineer

1. Performs detailed operability analysis for the support/piping system due to a discrepant support.

2. Reanalyzes discrepant supports.

3. Recommends modifications to discrepant supports if necessary.

Designer/Draftsman

1. Revises pipe support drawings based on input from Pipe Support Stress Engineer.

Installation Supervisor

1. Direct supervision of mechanics/welders.

2. Initiates requests for Radiation Work Permits and coordinates.

3. Coordinates materials for welding, other tooling.

Mechanics/Welders

1. Insulation removal and reinstallation.

2. Scaffolding installation and removal.

3. Restoration of discrepant supports.

Radiation Protection Technician

1. Perform surveys, assist in processing Radiation Work Permits.

APPENDIX A

SAFETY-RELATED PIPING ≥ 2 1/2" DIAMETER & GREATER

NOTE: Inspections will be carried up to the first anchor point beyond the interface of QA Category I and Non-QA Category I piping.

1. Residual Heat Removal (Includes RHR Service Water From Pumps)
2. High Pressure Coolant Injection
3. Core Spray
4. Reactor Core Isolation Cooling
5. Reactor Building Ventilation - Cooling water to/from engineered safeguards equipment
6. Emergency Service Water
7. Main steam from reactor vessel up to but not including the turbine stop valve, and connected piping of 2-1/2 inches or larger nominal pipe size up to and including the first valve that is either normally closed or capable of automatic closure during all modes of normal reactor operation.
8. Feedwater from reactor vessel up to the first anchor beyond the first isolation valve external to the drywell, and connected piping of 2-1/2 inches or larger nominal pipe size up to and including the first valve that is either normally closed or capable of automatic closure during all modes of normal reactor operation.
9. Control Rod Drive
10. Reactor Water Recirculation System
11. Drywell Vent and Purge
12. Standby Gas Treatment
13. Standby Liquid Control

APPENDIX A

SAFETY-RELATED PIPING - 2 1/2" DIAMETER & GREATER
(cont.)

14. Emergency Diesel Generator (Exhaust Piping)

15. Fire protection subsystems used to protect safety related systems, components, and structures

16. Fuel pool cooling and cleanup

17. Control Room Emergency Ventilation

18. Reactor Water Cleanup

19. Chill Water

20. Reactor Building Closed Loop Cooling Water

APPENDIX B

QA CATEGORY I - SAFETY-RELATED PIPING - LESS THAN 2 1/2" DIAMETER

* 1. Control Rod Drive (Also Portions per NUREG 0803)

2. Automatic Depressurization (From Double Check Valves to Accumulators)

3. Main Steam Leakage Collection

4. Reactor Water Cleanup (Bottom Drain)

* 5. High Pressure Coolant Injection (Branch Lines)

* 6. Reactor Core Isolation Cooling (Branch Lines)

* 7. Main Steam (Branch Lines)

* 8. Feedwater (Branch Lines)

* 9. Nuclear Boiler Instrumentation

* - The piping either normally forms the reactor coolant pressure boundary or is a small high Energy Line located in the secondary containment.

APPENDIX C

PIPING DESIGNATED FOR INSPECTION DUE TO ADDITIONAL REGULATORY REQUIREMENTS

1. Turbine Building Ventilation (Specific Portions)