

TECHNICAL EVALUATION REPORT
INDIAN POINT 3 NUCLEAR POWER PLANT
SEISMIC QUALIFICATION OF AUXILIARY FEEDWATER SYSTEM

1. INTRODUCTION

Since the accident at Three Mile Island, considerable attention has been focused on the capability of nuclear power plants to reliably remove decay heat. The NRC has recently undertaken Multiplant Action Plan C-14 "Seismic Qualification of AFW Systems" [Ref. 1], which is the subject of this evaluation.

To implement the first phase of Action Plan C-14, the NRC issued Generic Letter No. 81-14 "Seismic Qualification of AFW Systems" [Ref. 2], dated February 10, 1981, to all operating PWR licensees. This letter requested each licensee (1) to conduct a walk-down of non-seismically qualified portions of the AFW system and identify deficiencies amenable to simple actions to improve seismic resistance, and (2) to provide design information regarding the seismic capability of the AFW system to facilitate NRC backfit decisions.

The licensee of Indian Point 3 Nuclear Power Plant responded with a letter dated August 28, 1981 [Ref. 3]. The licensee's response was found not to be complete and a Request for Additional Information (RAI) was issued by the NRC, dated April 9, 1982 [Ref. 4]. The licensee provided a supplemental response in a letter dated September 2, 1982 [Ref. 5].

This report provides a technical evaluation of the information provided in the licensee's responses to the Generic Letter, and includes a recommendation regarding the need for additional analysis and/or upgrading modifications of this plant's AFW system.

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2. EVALUATION

Information provided in licensee's responses included:

- o Specification of the overall seismic capability of the AFW system.
- o Identification of AFW system components that are currently non-seismically qualified for SSE.
- o Discussion of levels of seismic capability of non-seismically qualified components.
- o Description of the AFW system boundary.
- o Status of compliance with seismic related NRC Bulletins and Information Notices.
- o Results of walk-down of non-seismically qualified areas.
- o Additionally, schematic sketch of the AFW system.
- o Additionally, description of methodologies and acceptance criteria for seismically qualified components.
- o Additionally, results of seismic interaction study of non-seismically qualified components outside and in the vicinity of the AFW system.

We have reviewed the licensee's responses, and a point-by-point evaluation of licensee's responses against Generic Letter's requirements is provided below.

(1) Seismic Capability of AFW System

Except for those items identified in the following, the AFW system has been designed, constructed and maintained to withstand an SSE of 0.15g horizontally and 0.10g vertically utilizing methods and acceptance criteria consistent with that applicable to other safety-related systems in the plant. Presently, those items identified by the licensee as not being fully seismically qualified are evaluated below:

- o Pumps/Motors - None
- o Piping - The portion of the 12" piping connecting the hotwell to the AFW suction line (No. CT-1070) that is between valves LCV-1158 and LCV-1128 is seismic Class III. The licensee stated that it is not necessary to rely upon the operability of this pipe during an SSE in order to provide adequate flow from the condensate storage tank to the auxiliary feedwater pumps. They stated that, prior to the condensate storage tank level decreasing to its technical specification low limit, automatic closure of the seismically qualified valve LCV-1158 and actuation of low level alarm in the control room will occur and the available water is sufficient to remove heat generated by the reactor for 24 hours at hot shutdown conditions. However, we believe that, if this section of piping should fail during a seismic event and the single failure is assumed to be the isolation valve LCV-1158, a path is created that would jeopardize the capability of the condensate storage tank to provide adequate water to the AFW system. Since the licensee has not indicated plans to upgrade this pipe, we judge that the present level of seismic capability of AFW system piping is less than OBE.
- o Valves/Actuators - Valve LCV-1128 is seismic Class III. The licensee has stated that they are not planning any action on upgrading this valve due to the discussion made above in the piping evaluation section. However, we believe that the valve LCV-1128 is the second valve required on the AFW system boundary and therefore we judge that the present level of seismic capability of the valves is less than OBE.
- o Power Supplies - The licensee has stated that the seismic qualification data is not available for two motor control centers (Nos. 34 and 39), two 480V switchgear units (Nos. 31 & 32), and three 125 VDC power panels (Nos. 31, 32 & 33). Investigations are currently underway with the vendors

and they are scheduled to be completed prior to start-up from the cycle 4/5 refueling outage which would occur in the summer of 1984. However, the licensee did not indicate that identified deficiencies would actually be corrected. We judge that the power supplies currently possess a level of seismic capability less than the OBE.

o Water Source(s) - None

o Initiation/Control Systems - (a) The licensee has stated that the seismic qualification data is not available for the speed control system for the turbine AFW pump, the ITT Barton flow control switches (FC-1135S & 1136S), and static "0" ring. The licensee indicated that these deficiencies would be investigated with the vendor, but did not indicate that corrective actions will be taken. (b) Field routed instrument air piping in the AFW pump room is currently supported by rod hangers or frictional clamps which appear to lack sufficient seismic resistance. The licensee plans to provide additional restraints and/or modify the existing ones. (c) Instrumentation and control rack No. 28 is free standing without any bolts. Moreover, the grout is not provided and the bottom of the rack is rusted. Corrective actions are planned. (d) Nitrogen bottles are free standing and tied only with chains and ropes. Additional restraints have been planned. (e) AFW pumps local control panel appears to lack adequate seismic resistance in the lateral direction. The licensee plans to check with the vendor for additional lateral support or X-bracing; however, corrective actions are not committed to. Actions for all items described above are planned for completion before startup from the cycle 4/5 refueling outage which would occur in the summer of 1984. Because no commitments for upgrade/modification have been identified for items (a) and (e), we conclude that the seismic capability of the initiation/control systems is less than OBE.

- o Structures - The turbine building is seismic Class III, and it supports and/or houses the 12" pipe (CT-1070), valve LCV-1128, and possibly some other essential AFW system components. The licensee has no plans to upgrade/modify this building. We therefore conclude that the present level of seismic capability of the structures is less than OBE.

Based on our evaluation described above, those areas of the AFW system judged not to possess an SSE seismic capability are identified below.

o	<u>Pumps/Motors</u>	None
o	<u>Piping</u>	Less than OBE
o	<u>Valves/Actuators</u>	Less than OBE
o	<u>Power Supplies</u>	Less than OBE
o	<u>Water Source(s)</u>	None
o	<u>Initiation/Control Systems</u>	Less than OBE
o	<u>Structures</u>	Less than OBE

In summary, our evaluation indicates that the licensee's AFW system does not possess an overall seismic capability that can withstand an SSE.

The primary water source is the condensate storage tank which is seismically qualified. A secondary water source is provided from the non-qualified city water system. However, since the primary water source and supply path is seismically qualified, switchover to a secondary water source is not involved.

Seismic qualification information for any alternate decay heat removal system was requested by the Generic Letter 81-14 if substantial lack of seismic qualification of the AFW system is indicated. We did not find that the licensee's AFW system has an SSE capability, and the licensee's responses did not provide information on any alternate decay heat removal system.

Regarding the AFW system boundary, the licensee stated that it fully conforms to the definitions of GL 81-14. However, the branch line CT-1070 is a part of AFW system and has a non-qualified second isolation valve LCV-1128 which the licensee has no plans for upgrading. We therefore believe that the AFW system boundary does not fully conform to the definition of GL 81-14.

The licensee stated that the AFW system was included within the scope of the seismic related NRC Bulletin 79-02, 79-04, 79-07, 79-14 and 80-11. Regarding the IE Information Notice 80-21, nine representative items have been evaluated and the results are generally applicable to the AFW system.

(2) Walk-Down of Non-Seismically Qualified Portion of AFW System

The licensee stated that a walk-down of the AFW system was jointly performed by the licensee and their consultant, Ebasco Services, and it was limited to the AFW pump building where the major portion of the AFW system is located. Also components of the support system were followed outside the building to maximum possible and practical extent. Walk-down of the Class III pipe CT-1070 indicated that it has inadequate supports. It has been proposed by the licensee's consultant to provide three orthogonal restraints to the portion of this pipe in the pump building, and the licensee has decided not to perform any action on this item as was previously discussed under the piping evaluation. Walk-down on the initiation/control systems has identified several deficiencies along with corrective actions as previously discussed under the initiation/control systems evaluation. In conclusion, we believe that the walk-down is not complete because it did not cover the non-seismically qualified turbine building and the valve LCV-1128.

(3) Additional Information

The licensee provided a schematic sketch of the AFW system including the water sources, heat sink, suction and discharge piping, major mechanical equipment, and structures supporting and housing the AFW system items.

Additionally, licensee's responses provided a description of the methodologies, loading combinations and acceptance criteria that were used in the design of the seismically qualified portions of the AFW system by referring to the appropriate sections of the FSAR.

Additionally, the licensee provided the results of a seismic interaction study of the components outside and in the vicinity of the AFW system, to assess their effect on the AFW system. The components in the following list are considered by the licensee to be the major contributors to unacceptable interaction affecting AFW system functionality: (a) Crane/monorail structure located directly above the two motor driven and the turbine driven AFW pumps. (b) 4" non-seismic floor drain pipe directly above the electrical cable trays containing essential safety related equipment. (c) Space heaters and electrical lighting fixtures located directly above essential safety related equipment and structures. (d) Non-seismic electrical cable trays and conduit routed directly above essential safety related equipment and structures. (e) Large non-seismic instrument racks located within close proximity to essential safety related equipment and structures. (f) Large roll-up door located in the shieldwall whose structural failure could affect the flow control stations of the turbine driven AFW pumps. The licensee did not indicate any plans to investigate or correct the above mentioned deficiencies.

3. CONCLUSIONS

The information contained in licensee's responses to the Generic Letter 81-14 is complete. The licensee identified the non-seismically qualified portions of the AFW system and conducted a partial walk-down of these items. Investigations of the power supplies and initiation/control systems were scheduled by the licensee to be completed before the cycle 4/5 refueling outage in the summer of 1984. No plans were given, however, for any possible actions resulting from such investigations. Also, we conclude that the AFW system boundary does not fully conform to the boundary definitions specified in the Generic Letter 81-14.

Based on the submitted information, we conclude that presently the AFW system at the Indian Point 3 Nuclear Plant cannot withstand an SSE. Therefore, we recommend that the NRC consider requiring the licensee: (a) to complete the walk-down of the non-seismically qualified components of the AFW system within a reasonable time, and (b) to upgrade/modify the non-seismically qualified portions of the AFW system under NRC Multiplant Action Plan C-14.

REFERENCES

1. D. G. Eisenhut, U. S. Nuclear Regulatory Commission, memorandum to H. R. Denton, "Multiplant Action Plan C-14; Seismic Qualification of Auxiliary Feedwater Systems," February 20, 1981.
2. U. S. Nuclear Regulatory Commission, Generic Letter No. 81-14 to all operating pressurized water reactor licensees, "Seismic Qualification of Auxiliary Feedwater Systems," February 10, 1981.
3. J. P. Bayne, Power Authority of the State of New York, letter to D. G. Eisenhut of U. S. Nuclear Regulatory Commission, August 28, 1981.
4. U. S. Nuclear Regulatory Commission, letter to Power Authority of the State of New York, "Request for Additional Information on Seismic Qualification of the Auxiliary Feedwater System, Indian Point 3 Nuclear Power Plant," April 9, 1982.
5. J. P. Bayne, Power Authority of the State of New York, letter to S. A. Varga of U. S. Nuclear Regulatory Commission, September 2, 1982.