

September 17, 1982

TECHNICAL EVALUATION REPORT
TURKEY POINT NUCLEAR PLANT UNITS 3 AND 4
SEISMIC QUALIFICATION OF AUXILIARY FEEDWATER SYSTEM

I. 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 Turkey Point Units 3 and 4 responded with a letter dated September 8, 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 May 25, 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 Additionally, schematic sketch of the AFW system.
- o Additionally, description of methodologies and acceptance criteria for seismically qualified components.
- o Additionally, modification associated with installation of new turbines along with schedules for such modifications.

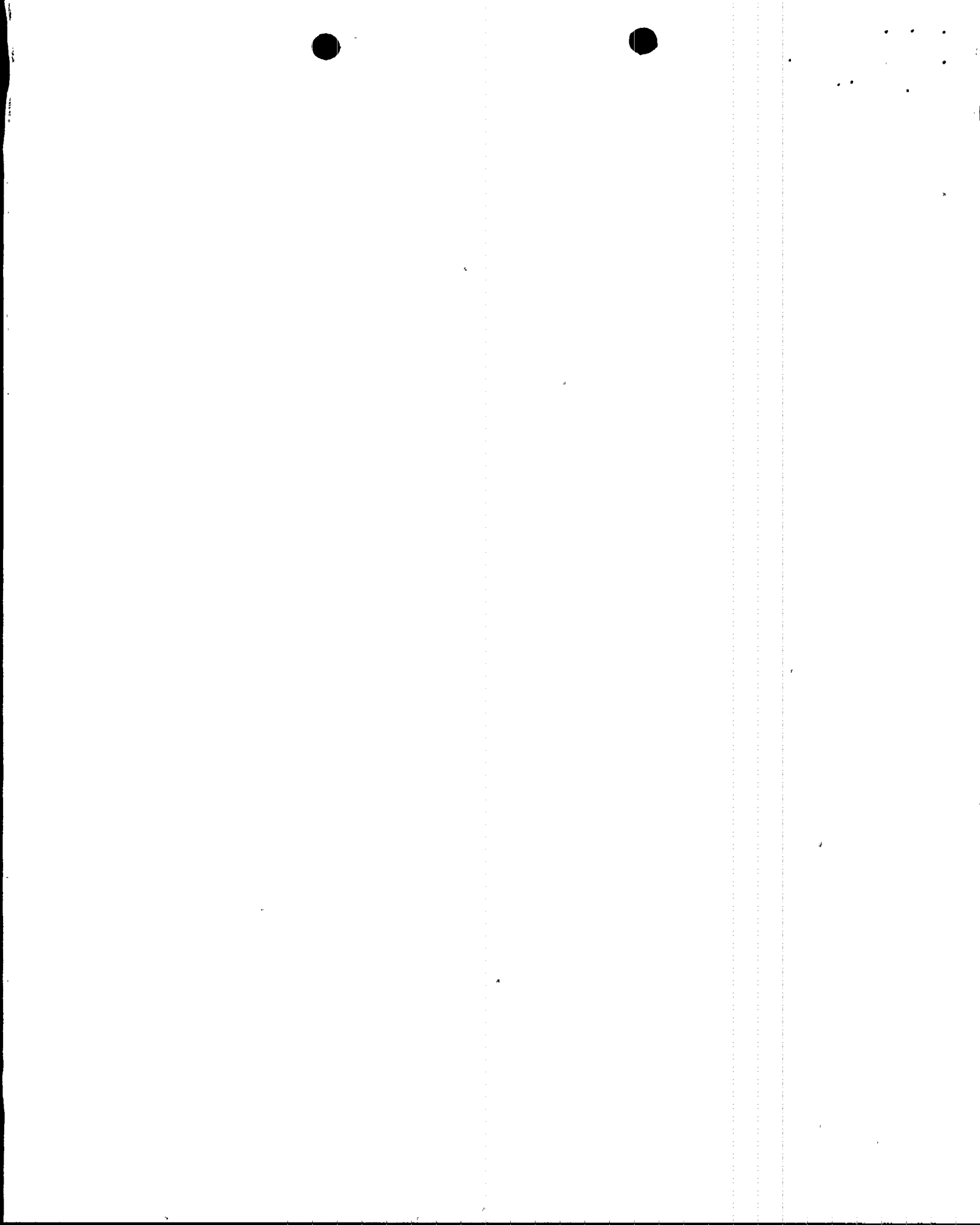
We have reviewed the licensee's responses, and a point-by-point evaluation of licensee's responses against Generic Letter's requirements is provided below.

(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 utilizing methods and acceptance criteria consistent with those applicable to other safety-related systems in the plant. Presently, those items identified by the licensee as not being fully qualified seismically are evaluated below:

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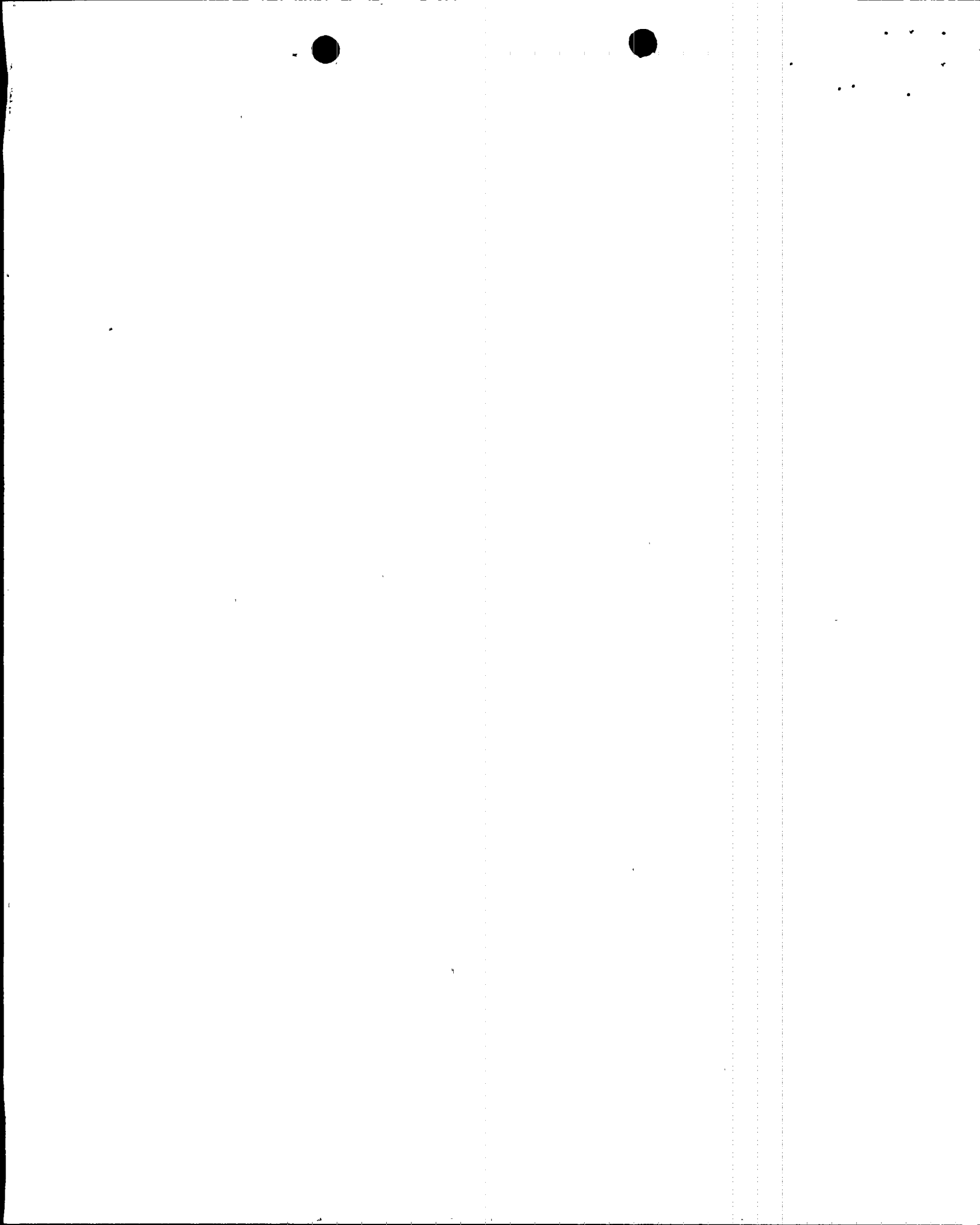
- o Pumps/Motors - Condensate transfer pump and the condensate recovery transfer pump are not seismically qualified. The licensee indicated these pumps are not required to function and will be disconnected from the AFW pump suction as a result of the new demineralized water system modifications during the Unit 4 steam generator repair outage. We judge that the present seismic capability of pumps/motors is less than OBE because the licensee did not discuss the seismic capability of the condensate transfer pump and the condensate recovery transfer pump; however, the pumps/motors will possess an SSE level of seismic capacity when the new demineralized water system modifications are completed.
- o Piping - The condenser make-up line, a branch line from the AFW pump suction, is not seismically qualified. Currently, a new demineralized water system is being installed which will include a new make-up line. The existing branch line from the AFW suction will be cut and capped when the new demineralized water system is placed in service during the Unit 4 generator repair outage in October 1982. We judge the seismic capacity of piping is presently less than OBE, but will be at the SSE level when the new make-up line is in place and the existing one cut and capped.
- o Valves/Actuator - The 3/4 inch air-operated vent valves located downstream of the motor-operated steam admission valves to the AFW turbines are provided to prevent the AFW turbines from turning due to valve leakage. Failure of these valves in the open position will affect these valves in performing the required function. However, the licensee stated that the inability of these valves to perform their required function will not prevent the AFW system from performing its safety function. Therefore, we conclude that the present level of seismic capability of the valves/actuators is equivalent to the SSE.



- o Power Supplies - The power supplies for the flow indication and flow control for Unit 4 are not seismically qualified. The licensee stated that modifications are planned to be performed in Unit 4 during the next scheduled outage of sufficient duration. We judge that the seismic capability of the power supplies in Unit 4 is presently less than OBE, but will be upgraded to SSE level upon completion of modifications.
- o Water Source(s) - The licensee stated that the primary water source and path includes a nonseismically qualified condensate recovery tank, which supports the condensate recovery pump acting as a seismic pipe anchor. The condensate recovery line will be disconnected from the AFW pump suction as a result of the new demineralized water system modifications. Regarding the installation of the new demineralized water system, the DWDS storage tank is complete. The tie-ins to Unit 3 were completed prior to its start up from its steam generator repair outage. The tie-ins to Unit 4 will be completed during the Unit 4 steam generator repair outage starting in October 1982. We conclude that the entire primary water source and path will possess an SSE level seismic capacity when the licensee completes the new demineralized water system.
- o Initiation /Control Systems - Nonseismically qualified areas are discussed as follows. (a) The condensate storage tank level transmitter was procured to control grade. The licensee stated that loss of function of the transmitter and indicator will not prevent the AFW system from performing its function. In addition, redundant safety grade indication is being added. (b) Local pressure indicators were procured to control grade. The licensee stated that loss of the pressure indicator function will not prevent the AFW system from performing its required function. (c) Pressure switches located upstream of the AFW turbine trip and throttle valves are currently used to initiate the air supply to the normally closed turbine pressure reducing valve. However, the need for these pressure switches with the new high pressure AFW turbines has yet to be determined by the licensee since the normally closed turbine pressure reducing valves will be replaced by normally open trip and

throttle valves. (d) AFW flow control and indication was originally procured to control grade standards. This is currently being upgraded to safety grade. (e) The nitrogen backup system is provided to supplement the instrument air used for AFW control. The licensee stated that the components of the backup system were procured to industrial standards and installed seismically. Without information on its specific seismic capability, we believe that the nitrogen backup system can only withstand an OBE. Based on the above information, we conclude that the present level of seismic capability of the initiation/control systems is less than OBE because of concerns (c) and (e) discussed above.

- o Structures - (a) The turbine building is not a seismic Class I structure. However, the licensee believes that the building has a considerable inherent rigidity and is resistant to the low OBE and SSE loads for the Turkey Point Plant. The portions of the east side of the turbine building that support portions of the AFW piping have been analyzed for seismic loads and are within the allowable stress. (b) The condensate transfer pump foundation, the condensate recovery pump attachment to the condensate recovery tank, the condensate recovery tank foundation, and the condensate storage tank level transmitter attachment to condensate storage tank are not seismic Class I. However, licensee's engineering judgment indicated that they possess an adequate seismic capacity since seismic loads are low at Turkey Point Plant. In addition, the licensee indicated that the several minor maintenance action items identified during walk-down of these supporting structures have been corrected. We therefore judge that the structures possess an SSE level of overall capability under the given circumstances.



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>	None*
o	<u>Valves/Acutators</u>	None
o	<u>Power Supplies</u>	None**
o	<u>Water Source(s)</u>	None
o	<u>Initiation/Control Systems</u>	Less than OBE
o	<u>Structures</u>	None

Note:

* Presently less than OBE, and will be fully qualified when licensee's proposed upgrade/modification is completed.

** Presently less than OBE for Unit 4, and will be fully qualified when licensee's proposed upgrade/modification is completed.

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

The primary water source and supply path is currently not seismically qualified but will possess an SSE capacity when the licensee completes the new demineralized water system modifications. Therefore, information on switchover to a seismically qualified secondary water source and supply path is not involved.

Seismic qualification information for any alternate decay heat removal system was not provided in the licensee's responsés. This information was requested by GL 81-14 if substantial lack of seismic qualification is indicated for the AFW system. Based on the information provided by the licensee we did not find that the licensee's AFW system has an SSE capability. However, we judge that information on an alternate decay heat removal system seismically qualified to the SSE level and appropriate operating procedures are not needed if the licensee is required to re-analyze and/or modify the existing AFW system to an SSE capacity.

Regarding the AFW system boundary, branch lines structurally coupled to the AFW system have been seismically analyzed up to the points of three orthogonal restraints; however, the licensee stated that branch lines in general have been considered up to only the first normally closed valves. Therefore, the AFW system boundary does not fully conform to the definition given in the Generic Letter 81-14. Since the licensee did not provide any discussion to justify this deviation, we judge that this deviation has the potential to impact the reliability of the AFW system to perform the required safety function.

The licensee stated that the AFW system was included within the scope of the seismic related NRC Bulletins 79-02, 79-04, 79-07, 79-14, 80-11, and IE Information Notice 80-21.

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

A walk-down has been performed for those portions of the AFW system where sufficient information was not retrievable to verify the seismic qualification. The results of walkdown indicated deficiencies in those AFW system components as previously discussed in Section (1) along with modification plans.

(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.

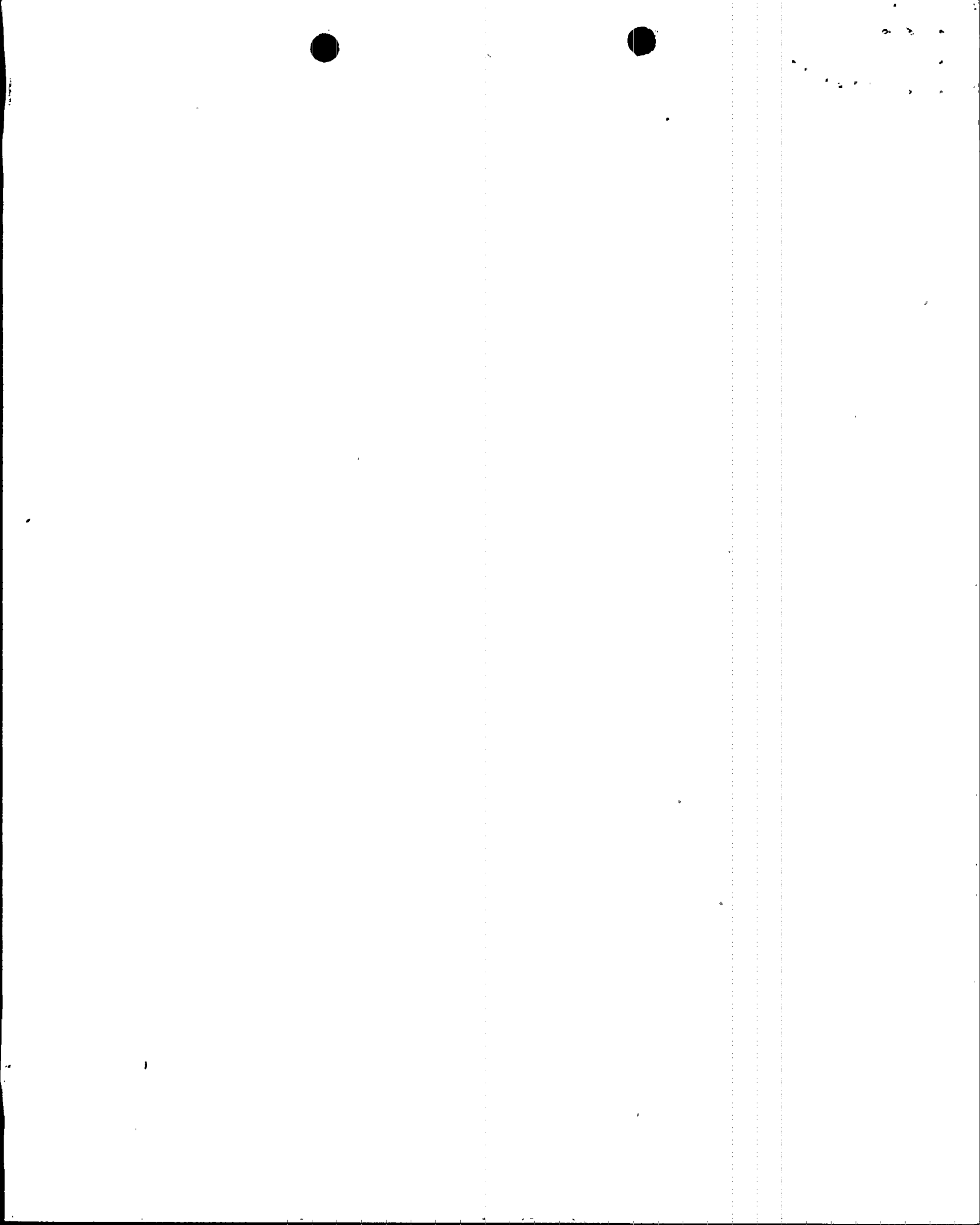
Additionally, licensee's responses provided a description of the methodologies, loading combinations and acceptance criteria that were used in the design of the seismically qualified portions of the AFW system.

In addition, the licensee plans to add trip and throttle valves associated with new turbines. The installation of these turbines will be accomplished during the Unit 4 steam generator repair outage.

3. CONCLUSION

The information contained in licensee's responses to Generic Letter 81-14 is complete except that regarding the present level of seismic capability of some areas of the initiation/control systems. The walk-down conducted by the licensee identified some deficiencies and corrective actions were planned with completion dates provided. The licensee has stated that the AFW system will be upgraded during the Unit 4 steam generator repair outage commencing in October 1982. However, no plan is given of modification of the nonseismically qualified portion in the initiation/control systems. The licensee has also stated that the AFW system boundary extends to only the first normally closed valves on branch lines and therefore it does not fully conform to the definition specified in the Generic Letter 81-14.

Based on the submitted information, we conclude that the AFW system does not provide a reasonable assurance to perform its required safety function following an SSE because presently portions of the initiation/control systems do not have an SSE seismic capacity and the AFW system boundary does not conform to GL81-14's requirements. In conclusion, we recommend that the NRC considers requiring the licensee (a) to provide a re-analysis and/or modification to acquire an SSE capacity for the initiation/control systems, and (b) to evaluate and/or correct the AFW system boundary deviation to assure the required safety function.



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. R. E. Uhrig, Florida Power & Light Company, letter to D. G. Eisenhut of U. S. Nuclear Regulatory Commission, September 18, 1981.
4. S. A. Varga, U. S. Nuclear Regulatory Commission, letter to R. E. Uhrig of Florida Power & Light Company, "Request for Additional Information on Seismic Qualification of the Auxiliary Feedwater System, Turkey Point Units 3 & 4," April 9, 1982.
5. R. E. Uhrig, Florida Power & Light Company, letter to S. A. Varge of U. S. Nuclear Regulatory Commission, May 25, 1982.

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