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Director of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Mr. Steven A. Varga, Director
PWR Project Directorate No. 3
Division of PWR Licensing-A

Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Anticipated Transients Without Scram (ATWS) Rule (10 CFR 50.62); ATWS Mitigating Systems Actuation Circuitry (AMSAC) Plant Specific Design Information

References:
1. NYPA letter (J. C. Brons) to NRC (S. A. Varga), dated October 10, 1986, regarding "AMSAC Implementation Schedule."
2. NRC letter (J. D. Neighbors) to NYPA (J. C. Brons), dated September 18, 1986, enclosing the Safety Evaluation (SE) of the Westinghouse Owners Group (WOG) Topical Report of WCAP-10858 "AMSAC Generic Design Package."

Dear Mr. Varga:

In Reference 1 the Authority committed to submit the plant specific design information requested by Reference 2. This information is necessary in order to enable the NRC staff to perform a pre-implementation review of the Indian Point 3 (IP-3) AMSAC design.

The final AMSAC system selected for IP-3 is based on the generic Logic 2 option (Main Feedwater Low Flow Actuation) as described in WCAP-10858. This system is planned to be installed during the Cycle 6/7 Refueling Outage which is currently scheduled for late 1988.

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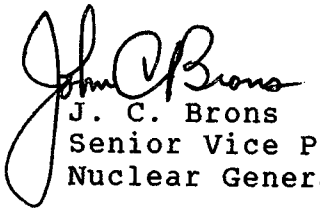
Attachment I to this letter provides a general description of the IP-3 AMSAC design. The responses to the plant specific items addressed in the NRC AMSAC SER are contained in Attachment II.

Should you or your staff have any questions regarding this matter, please contact Mr. P. Kokolakis of my staff.

Very truly yours,



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cc: Resident Inspector's Office
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ATTACHMENT I

AMSAC DESIGN DESCRIPTION

NEW YORK POWER AUTHORITY
INDIAN POINT UNIT 3
DOCKET NO. 50-286

ATTACHMENT I

AMSAC DESIGN DESCRIPTION

The selected AMSAC design for IP3 mitigates the consequences of an ATWS loss of heat sink event by actuation of AMSAC (Turbine Trip and initiation of the auxiliary feedwater system) on low main feedwater flow measurements. Feedwater flow will be measured by the low range feedwater flow transmitters located on the steam generator main feed lines. These transmitters monitor the feed flow rate to the steam generator during plant startup and shutdown. These transmitters will be used to provide the AMSAC signals. The attached drawing (No. ESK-ATWS-3) illustrates the basic logic and equipment connections. The turbine power level logic will be supplied from existing first stage pressure sensors with new isolators to provide separation between safety related Reactor Protection System (RPS) and non-safety related (AMSAC) portions of the system.

IP3 employs two (2) turbine driven main feedwater pumps each capable of delivering approximately 50% of the full power flow requirements. The low range feedwater flow transmitters provide accurate measurements over their entire range (0 - 30% of full flow). The Authority plans to actuate AMSAC at 20% of nominal main feedwater flow. Actuating AMSAC at too high a percentage of feedwater flow, i.e., approximately 50%, will result in unnecessary plant trips caused by loss of a main feedwater pump. The Authority considers this value (20%) justified based on previous ATWS analyses performed by Westinghouse.

The auxiliary feedwater system at IP3 utilizes two (2) motor driven pumps and one (1) turbine driven pump. Upon receipt of an AMSAC actuation signal, the two motor driven pumps will start automatically and deliver 100% of the required auxiliary feedwater flow. The turbine driven auxiliary feedwater pump will be manually started in accordance with existing plant emergency procedures.

The primary power supply to the AMSAC cabinet will be independent from Reactor Protection System (RPS). Power will be taken from the Emergency Lighting Panel 319A which is fed from a motor control center connected to the station normal and emergency (Diesel Generator) power supplies. This feed will supply a new battery pack inverter system uninterruptible power supply (UPS) which will power the AMSAC panel.

The mitigating signals from the AMSAC cabinet (Turbine Trip and the Auxiliary Feedwater Pump Start) will be designed independent of the RPS. Interference between RPS operation and AMSAC will not occur. The existing manual operation of the turbine trip and the auxiliary feedwater pump start functions are still retained.

The AMSAC signal actuation is based on 3/4 coincidence logic. The signal will be automatically blocked below 70% power. As required by the NRC AMSAC SER, the system will remain armed maintaining the signal for approximately 120 seconds, should the turbine power level decrease below 70% during a transient. The AMSAC signals will be delayed by approximately 25 seconds to permit RPS to respond first.

ATTACHMENT II

RESPONSES TO NRC'S SER ON
AMSAC GENERIC DESIGN

NEW YORK POWER AUTHORITY
INDIAN POINT UNIT 3
DOCKET NO. 50-286

Diversity

The plant specific submittal should indicate the degree of diversity that exists between the AMSAC equipment and the existing Reactor Protection System. Equipment diversity to the extent reasonable and practicable to minimize the potential for common cause failures from the sensors output to, but not including, the final actuation device, e.g., existing circuit breakers may be used for the auxiliary feedwater initiation. The sensors need not be of a diverse design or manufacturer. Existing protection system instrument-sensing lines, sensors and sensor power supplies may be used. Sensor and instrument sensing lines should be selected such that adverse interactions with existing control system are avoided.

Response

It should be noted that although there is no requirement, the sensors which will be used to monitor an ATWS event are diverse (Rosemount) from the existing sensors employed by the RPS (Foxboro). AMSAC feed flow instrument sensing lines, logic circuits and power supplies for the AMSAC cabinet will be diverse from RPS logic. Presently, a Foxboro electromechanical system is being used for RPS. AMSAC will employ a solid state system or provide other means of diversity (different manufacturer or principle of operation).

The commonality exists in the final actuation devices for the turbine trip and the start up breaker of the auxiliary feed water pump in accordance with the NRC AMSAC SER. Suitable isolation devices will be used to meet the safety related equipment and separation criteria.

The Turbine Power Level (70%) sensing devices and the sensor power supplies for RPS and AMSAC are the same, which is acceptable as per SER. The logic input for AMSAC taken out of these sensors are from different Bi-Stable, I/I units and relays.

Logic power supplies

The plant specific submittal should discuss the logic power supply design. According to the rule, the AMSAC logic power supply is not required to be safety-related (Class-1E). However, logic power should be from an instrument power supply that is independent from the reactor protection system (RPS) power supplies. Our review of additional information submitted by WOG indicated that power to the logic circuits will utilize RPS batteries and inverters. The staff finds this portion of the design unacceptable, therefore, independent power supplies should be provided.

Response

The AMSAC power supply will be independent of the RPS power supplies. The primary AMSAC power supply will be taken from the emergency lighting panel 319A connected to a new uninterruptible power supply (UPS) dedicated to AMSAC. During maintenance of the UPS, a secondary power supply to AMSAC will be established from the same panel (319A).

Details are provided in Table 1.

AMSAC will be able to perform its safety functions in the event of a loss of offsite power.

TABLE 1

LOGIC POWER SUPPLY

	RPS	AMSAC
	Instrument Distribution Panel No.	Instrument Distribution Panel No.
A) Channel I (UPS) Inverter 32 or Transformer Feed from MCC 33	32	-
B) Channel II (UPS) Inverter 31 or Transformer Feed from MCC 34	31	-
C) Channel III (UPS) Inverter 34 or Transformer Feed MCC 36C	34	-
D) Channel IV (UPS) Inverter 33 or Transformer Feed from MCC 36C	33	-
E) Emergency Lighting Supply	-	Lighting Panel (Primary) 319A with dedicated UPS

Safety-related interface

The plant submittal should show that the implementation is such that the existing protection system continues to meet all applicable safety criteria.

Response

The AMSAC is being designed independent of the RPS with necessary separation in the logics such that no interference can occur between RPS and AMSAC both in design and operation. The cable routing and AMSAC cabinet location will ensure that there is no interaction with RPS equipment. New qualified isolation devices will be used to separate AMSAC turbine power level inputs.

Quality Assurance

The plant specific submittal should provide information regarding compliance with Generic Letter 85-06 "Quality Assurance Guidance for ATWS Equipment that is not Safety-Related."

Response

10 CFR 50.62 states that ATWS equipment is not required to be safety related. The Quality Assurance (QA) for AMSAC test, maintenance and surveillance will be consistent with the plants current practices for non-safety related equipment. The Generic Letter 85-06 guidance, will be adopted for AMSAC related QA activities.

Maintenance Bypasses

The plant specific submittal should discuss how maintenance at power is accomplished and how good human factors engineering practice is incorporated into the continous indication of bypass status in the control room.

Response

The AMSAC design will provide manual bypass of the mitigating function for test, repair and calibration during operation. The design will be such that testing can be performed without using jumpers, lift leads, pulling fuses, physically blocking relays, or tripping breakers. A permanent bypass test set up will be used. The bypass condition will be automatically and continously indicated to the operator in the control room.

The AMSAC design specification will incorporate the human factors addressed in NRC AMSAC SER. This will be performed in accordance with the criteria of Appendix J to IP3 Detailed Control Room Design Review Summary Report submitted to the NRC on October 31, 1985.

Operating bypasses

The plant specific submittal should state that operating bypasses are continously indicated in the control room; provide the basis for the 70% or plant specific operating bypass level; discuss the human factors design aspects of the continous indication; and discuss the diversity and independence of the C-20 permissive signal (Defeats the block of AMSAC).

Response

AMSAC operating bypasses will be continously indicated in the control room. As previously stated, the design and implementation of AMSAC will address human factors engineering. The AMSAC cabinet specification has been prepared taking into account human factors in the layout of the equipment on the panel. The Authority through the Westinghouse Owners Group is performing further analysis to address the basis for not arming AMSAC below 70% power. The Authority intends to block AMSAC acutation below 70% power. C-20 will be derived from the turbine first stage pressure which is used by the engineered safeguards actuation logic. The C-20 permissive signal circuitry will provide for new isolation devices to assure independence from existing design.

Means for bypassing

The plant specific submittal should state that the means for bypassing is accomplished with a permanently installed, human factored, bypass switch or similar device, and verify that disallowed methods mentioned in the guidance are not utilized.

Response

As stated previously in response to "Maintenance Bypasses", the AMSAC cabinet will have provisions for manual bypasses with a separate bypass test set up. Human factors considerations will be addressed in accordance with the NRC AMSAC SER and the criteria of Appendix J to IP-3 Detailed Control Room Design Review Summary Report.

Manual Initiation

The plant specific submittal should discuss how a manual turbine trip and auxiliary feedwater actuation are accomplished by the operator.

Response

The manual initiation of turbine trip and auxiliary feedwater actuation will continue to be based on the existing plant procedures. The AMSAC will not affect the existing manual operation of turbine trip and actuation of auxiliary feedwater in accordance with plant operating procedures. This is presently accomplished either by the operation of control switches/push buttons in the control room or at local panels.

Electrical independence from existing Reactor Protection System

The plant specific submittal should show that electrical independence is achieved. This is required from the sensor output to the final actuation device at which point non-safety-related circuits must be isolated from safety related circuits by qualified Class 1E isolators. Use of existing isolators is acceptable. However, each plant specific submittal should provide an analysis and tests which demonstrate that the existing isolator will function under the maximum worst case fault conditions. The required method for qualifying either the existing or diverse isolators is presented in Appendix A.

Response

The design will provide electrical independence between RPS and AMSAC. Isolating devices will be in accordance with the requirements identified in Appendix A of the NRC AMSAC SER. Except for the final actuation device, electrical independence will be maintained to prevent interaction with RPS.

Physical separation from existing reactor protection system

Physical separation from existing reactor protection system is not required, unless redundant divisions and channels in the existing reactor trip system are not physically separated. The implementation must be such that separation criteria applied to the existing protection system are not violated. The plant specific submittal should respond to this concern.

Response

The separation criteria for the existing RPS system will not be violated.

As stated previously, separate main feedwater flow sensor lines not associated with RPS, will be used for AMSAC.

Environmental qualification

The plant specific submittal should address the environmental qualification of ATWS equipment for anticipated operational occurrences only, not for accidents.

Response

All equipment associated with AMSAC will be located outside containment.

The equipment will be designed to operate in their respective environments taking into account anticipated operational occurences.

Testability at power

Measures are to be established to test, as appropriate, non safety related ATWS equipment prior to installation and periodically. Testing of AMSAC may be performed with AMSAC in bypass. Testing of AMSAC outputs through the final actuation devices will be performed with the plant shutdown. The plant specific submittals should present the test program and state that the output signal is indicated in the control room in a manner consistent with plant practices including human factors.

Response

In order to test the AMSAC logic periodically in accordance with the plant test procedures, a separate test bypass set up will be provided at the cabinet. Test procedures and operational instructions will be provided to test AMSAC logic outputs up to the final actuation device. Final output devices will be tested only during plant shutdown.

The AMSAC design specifications will incorporate good human factors engineering addressed in NRC SER.

Completion of mitigative action

AMSAC shall be designed so that, once actuated, the completion of mitigating action shall be consistent with the plant turbine and auxiliary feedwater circuitry. Plant specific submittals should verify that the protective action, once initiated, goes to completion, and that the subsequent return to operation requires deliberate operator action.

Response

The AMSAC cabinet will have no manual switch for an operator to stop or actuate, the AMSAC signal once initiated. Once the AMSAC signal is actuated, mitigation will go to completion. For subsequent operation, the operator in the control room will have a reset mode switch for AMSAC to return it to an operational mode only by deliberate operator action.

Technical specifications

Technical specification requirements related to AMSAC will have to be addressed by plant specific submittals.

Response

The Authority considers that the technical specifications for AMSAC should not be required. The Authority through the Westinghouse Owner's Group is addressing this issue with the NRC. The supplementary information to 10 CFR 50.62 states, in the design criteria, that the ATWS equipment is not required to be safety related. Also, the ATWS rule does not require technical specifications. AMSAC is used to mitigate an ATWS event which is an event beyond the licensing design basis. The plant Emergency Operating Procedures contain an ATWS response procedure.