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U. S. Nuclear Regulatory Commission
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Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Response to Request for Additional Information Concerning Proposed Technical Specification Changes Extending Engineered Safety Features Systems Testing to Accommodate A 24 Month Operating Cycle (TAC No. M86446)

References:

1. NRC letter, N. F. Conicella to R. E. Beedle, dated September 14, 1993, "Request for Additional Information Concerning the Proposed Technical Specifications Change Extending Engineered Safety Features Testing to Accommodate a 24 Month Operating Cycle for Indian Point Nuclear Generating Unit No. 3 (TAC No. M86446)."

2. NYPA letter, R. E. Beedle to NRC, dated May 21, 1993, "Proposed Changes to Technical Specifications Regarding Extending Engineered Safety Features Systems Testing to Accommodate a 24 Month Operating Cycle," (IPN-93-040).

Dear Sir:

This letter provides the Authority's response to the NRC's request for additional information (Reference 1). The request concerns the Authority's proposed Technical Specification changes (Reference 2) to extend engineered safety features testing to accommodate a 24 month operating cycle. The NRC's questions followed by the Authority's responses are contained in Attachment I to this letter.

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This letter contains no new commitments. If you have any questions, please contact Mr. P. Kokolakis.

Very truly yours,

Ralph E. Beedle

Attachments

cc: Regional Administrator
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ATTACHMENT I TO IPN-93-154

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING PROPOSED CHANGES TO TECHNICAL SPECIFICATIONS CONCERNING EXTENDING ENGINEERED SAFETY FEATURES SYSTEMS TESTING TO ACCOMMODATE A 24 MONTH OPERATING CYCLE

New York Power Authority
INDIAN POINT 3 NUCLEAR POWER PLANT
Docket No. 50-286

Response to Request for Additional Information

This attachment provides the Authority's response to the NRC's request for additional information. The request concerns the Authority's proposed Technical Specification changes to extend engineered safety features (ESF) testing to accommodate a 24 month operating cycle. The NRC's questions are followed by the Authority's responses.

NRC Question 1

During the past four refueling outages, 7 of 21 Safety Injection (SI) composite tests did not pass. Please explain the specific cause that led to each of these failures and identify the SI composite test that was being performed in each case.

NYPA Response

The SI composite tests are performed during refueling outages. These tests verify operability of the ESF actuation circuits by monitoring, when plant conditions permit, valve operation, pump circuit breaker actuation, diesel generator starts, and automatic sequencing of ESF equipment. The importance of these tests is to verify operability of the equipment actuation circuitry, such as the slave or auxiliary relays, time delay relays, associated contacts, and the pushbutton and three position control switches. A complete system test can not be performed when the reactor is operating because an SI signal causes a reactor trip, main feedwater isolation, and containment isolation. Therefore, system tests (during refueling outages) are combined with more frequent component tests (performed with the plant operating) to assure system reliability. For instance, bistables are checked during the monthly channel functional test, the coincident logic matrices are checked during the monthly logic functional test, and instrument transmitters are cross-checked every eight hour shift. The ESF pumps, valves, and other safeguards devices which are actuated by the ESF circuitry are tested in accordance with the Indian Point 3 Inservice Testing (IST) program or other Technical Specification requirements (i.e., the majority of the ESF equipment is tested at intervals more frequent than refueling outages).

The 7 failures referenced in Question 1 occurred during the performance of SI composite tests. The SI composite tests are simulated automatic actuation tests. The tests are also used to verify end-to-end system functionality during refueling outages. Consequently, potential component operability problems resulting from modifications or maintenance are sometimes detected during the performance of these tests. The following table provides a history of the specific SI composite tests. The subsequent paragraphs detail the cause of test anomalies.

ESFAS Refueling Surveillance Tests

Test	Description	1987	1989	1990	1992
3PT-R03A	Test of the Recirculation Switches	Pass	1	2	Pass
3PT-R03B	Sequencing Test - Breaker Timing / Bus Stripping	Pass	Pass	3	Pass
3PT-R03C	Safety Injection Initiation Test - Train 1 and Train 2	Pass	4	Pass	5
3PT-R03D	Safety Injection Blackout Test	Pass	Pass	6	Pass
3PT-R03E	Containment Isolation Test	7	Pass	Pass	Pass
3PT-R03F	Non SI Blackout Test (first performed in 1992)	N/A	N/A	N/A	Pass

1&2 3PT-R03A verifies that the recirculation switches function properly, as required by Technical Specifications 4.5.A.1.a and 4.5.A.1.b. Two failures of 3PT-R03A have occurred during the past four refueling outages.

The first failure occurred because of a faulty supply breaker to high head recirculation stop valve 888B (which had tested satisfactorily during the 1989 outage prior to performing 3PT-R03A), and post modification cross-wiring of the running lights for service water pumps 31 and 34 and component cooling water pump #33.

The second failure occurred because SI-MOV-1802A failed to stroke open upon demand. It should be noted, however, that the redundant recirculation pump discharge valve SI-MOV-1802B operated satisfactorily, and that in both cases, the ESF circuitry (i.e., the recirculation switches) worked properly and the affected equipment was repaired and tested satisfactorily prior to plant startup.

3 3PT-R03B verifies the breakers' start timing signals and the bus stripping signals for the safeguard components, as required by Technical Specifications 4.5.A.1.a, 4.5.A.1.b and 4.6.A.3. One failure of 3PT-R03B occurred during the past four refueling outages. The failure occurred because Agastat time delay relays required adjustments and/or replacements. Additional Agastat relay anomalies were also noted during the 1992 outage. (Note: The Agastat time delay relays are not being extended to 24 month test intervals at this time. The Authority is evaluating Agastat performance and plans to test the Agastats more frequently until a pattern of repeatable and acceptable Agastat time delay relay test results are obtained. By letter dated October 7, 1993, the Authority proposed changes to the Technical Specifications to incorporate a commitment to test the Agastats at intervals no greater than 18 months +25%.)

4&5 3PT-R03C verifies that all electrical controls function properly when SI is initiated, as required by Technical Specification 4.5.A.1.a and 4.5.A.1.b. Two test failures occurred during the past four refueling outages. The first failure occurred because of a faulty breaker feeding the #31 lighting transformer and mechanical binding problems with several fan cooler unit dampers (FCU Dampers 1296, 1300, and 1303). The second failure occurred because of a sticking piston in a fan cooler unit damper (SOV-1293). (Note: This damper previously tested satisfactorily during the 1992 outage prior to performing 3PT-R03C.) In both cases, the ESF circuitry (i.e., the SI actuation circuits) worked properly and the affected equipment was repaired and tested satisfactorily prior to plant startup.

6 3PT-R03D ensures that each diesel generator will automatically start and assume the required load by simultaneously simulating a loss of all normal AC station service power and an SI signal, as required by Technical Specifications 4.5.A.1.a & b, and 4.6.A.3. One failure occurred during the past four refueling outages. The failure occurred because the Agastat time delay relay for two spray additive tank valves (876A, B) and the supply breaker to bus 6A did not operate properly. The test also noted that a spray additive tank valve (876B) required limit switch adjustment. During this test, the diesel generator start circuitry and subsequent load sequencing worked properly with the exception of the Agastat time delay relays. The Agastat relays were adjusted. Corrective maintenance was performed on the supply breaker, and follow-up testing showed the affected devices worked properly prior to start-up.

7 3PT-R03E verifies that the containment isolation valves function properly when a containment isolation signal is initiated, as required by Technical Specification Table 4.1-3 Item (5) and 4.5.A.2.a. One test failure occurred during the past four refueling outages. The failure occurred because the isolation valves for the pressurizer relief tank sample (SOV-511) and the hydrogen analyzer return (SOV-549) were not tested because they did not open upon demand during test set-up. During the test, the containment isolation circuitry worked properly. Corrective maintenance fixed the solenoid valve problems and the valves were retested satisfactorily prior to start-up.

3PT-R03F verifies the auto-start of 31 and 33 Auxiliary Feedwater Pumps on a low-low steam generator level and the non-SI undervoltage condition, as required by Technical Specification Table 4.1-1, Item 28. This test was first performed in 1992 and no failures were noted.

Except for Agastats, the ESF relays and switches that are only tested during refueling outages are considered to be reliable, and their past performance has been acceptable. Furthermore, in reviewing SI composite test results, particular attention was directed towards those test anomalies which directly impacted test acceptance criteria and thus influence the capability of the SI system to perform its intended function. Although a minimal number of problem areas were identified, such events did not recur in subsequent system tests. In most cases, failures were related to refueling outage work (i.e., the as-found condition of the affected component tested satisfactorily prior to performing the SI composite test). The few remaining failures were isolated or random occurrences and were not deemed to be dependent upon cycle length. As a result, a 24 month test interval would have a negligible effect on the safety of the system.

Finally, a review of Indian Point 3 significant occurrence reports (SORs) from 1986 to mid 1992, and results from the 1987, 1989, 1990, and 1992 tests confirm that the refueling tests are not normally being relied upon to detect failures of the SI components. Therefore, extending the SI composite test intervals from 18 to 24 months will not affect overall safe plant operation.

NRC Question 2

For the proposed steam line flow testing requirement, please identify the specific instrumentation/circuitry that will be tested. Based on the testing that is currently conducted, have there been instrument failures with the steam line flow instrumentation/circuitry in the past? If there were failures, were they detected during channel checks or during calibrations?

NYPA Response

The main steam line flow channels consist of:

- flow transmitters (FT-419A & B, FT-429A & B, FT-439A & B and FT-449A & B);
- current repeaters (FM-419L & K, FM-429L & K, FM-439L & K and FM-449L & K);
- bistables (FC-419A & B, FC-429A & B, FC-439A & B, and FC-449A & B); and
- power supplies (FQ-419A & B, FQ-429A & B, FQ-439A & B and FQ-449A & B).

The main steam flow transmitters are calibrated on an 18 month (±25%) basis during refueling outages in accordance with calibration procedure 3PC-R43B. Channel checks are performed once per shift and functional tests are performed once per month for the current repeaters and bistables. The bistables are calibrated whenever the functional tests indicate that adjustment is necessary.

Past performance of the steam flow instruments has been acceptable, with occasional repair or replacement of equipment required. Faulty devices in the steam flow circuitry were detected during channel checks, channel functional tests and calibrations. In the future, Reference 2 proposes that calibrations of the flow transmitters be performed on a 24 month (±25%) interval. The response to Question 3 (below) shows the flow transmitters are suitable for a longer calibration interval.

NRC Question 3

Please provide the results of the steam line flow instrument drift analysis conducted in accordance with the guidelines of Generic Letter 91-04, "Changes in Technical Specification Surveillance Intervals to Accommodate a 24 Month Fuel Cycle."

NYPA Response

An instrument drift analysis (IDA) was conducted for the steamline flow transmitters. The purpose of the IDA is to assess extending the calibration interval from the current 18 months to a maximum of 30 (24 +25%) months. The analysis 1) compares past instrument performance to vendor acceptance limits (i.e., the vendor drift allowance (VDA)), and 2) predicts future drift by statistically extrapolating the derived data to arrive at a value for maximum expected drift over a 30 month interval (MED30). The Authority submitted proposed Technical Specification changes for extending Reactor Protection System (RPS) calibrations to accommodate a 24 month cycle (Reference 3). Attachment III of that submittal transmitted the RPS IDA, including a summary description of the methodology used in preparing it. The RPS IDA is representative of the drift analyses performed to support the 24 month cycle program, including the IDA for the steamline flow transmitters.

The steamline flow IDA (Attachment II) shows that past performance of the flow transmitters has been within vendor allowables at the maximum drift point in most cases (12 out of 16 times). The relatively few data points available for analysis resulted in the use of a high statistical multiplier for the calculation of the maximum expected drift for 30 months (MED30). This resulted in a highly conservative expected drift value of 6.8% span.

Generic Letter 91-04 requires the licensee to evaluate the effects of an extended calibration interval on instrument errors in order to confirm that drift will not result in instrument errors that exceed the assumptions of the safety analysis. To meet this requirement, NYPA performs or updates loop accuracy/setpoint calculations using the worst projected value of instrument drift (either vendor specified uncertainties or MED30) to represent calibration uncertainties for the 30 month interval. The results of these calculations evaluate the effects of the extended calibration interval on safety analysis assumptions. These calculations hold the greatest weight in determining whether a calibration interval can be safely extended. If the calculations show that the safety analysis assumptions are not violated, reasonable assurance exists that the calibration interval may be extended. Attachment II to Reference 1 described the use of extrapolated drift data in setpoint calculations, and Attachment IV to Reference 1 provided sample loop accuracy/setpoint calculations. The same methodology presented in those attachments was applied to the steamline flow transmitters.

The loop accuracy/setpoint calculation (Reference 2) was revised using the highly conservative MED30 value mentioned above. The calculation demonstrates that sufficient margin exists between the analytical limit and field trip settings for the high steam flow trip to account for the increased instrument inaccuracies associated with the extended calibration interval for the main steam flow transmitters.

New data points for the flow transmitters have recently been analyzed (Attachment III). This data shows the main steam flow transmitters are reliable and that calibration results are predictable. Further, these results confirm that the high statistical multiplier used in the original analysis yielded a conservative value for the predicted drift (MED30). The instrument drift analysis in combination with on-line testing such as channel checks and functional tests, shows that calibration intervals for the flow transmitters can be safely extended to a maximum of 30 months.

References:

1. NYPA letter, "Proposed Changes to Technical Specifications Regarding Extension of Surveillance Test and Calibration Intervals for Reactor Protection System (RPS) to Accommodate a 24 Month Operating Cycle," dated February 18, 1993.

2. NYPA Calculation, IP3-CALC-ESS-00277, Rev. 1, approved January 11, 1993, "Engineered Safety Features Actuation System Instrument Loop Accuracy/Setpoint Calculation/High Steam Flow."

ATTACHMENT II TO IPN-93-154

STEAM LINE FLOW INSTRUMENT DRIFT ANALYSIS FOR THE FLOW TRANSMITTERS
(ORIGINAL DATA)

New York Power Authority
INDIAN POINT 3 NUCLEAR POWER PLANT
Docket No. 50-286

PROCEDURE: 3PC-R43B   TITLE: MAIN STM FLOW CHECK & CAL. (WIDE RANGE)   SYSTEM: RPC

COMPONENT: FLOW TRANSMITTERS   MANUFACTURER: FOXBORO   MODEL NUMBER: N-E11DM-HIB-2BE

VDA6 = 1.8795 (100 - 270) DAYS	VDA12 = 1.8919 (271 - 450) DAYS	VDA18 = 1.8960 (451 - 630) DAYS	VDA24 = 1.9084 (631 - 810) DAYS
NDP = 8 NDP < VDA6 = 7 % < VDA6 = 87.5	NDP = 8 NDP < VDA12 = 5 % < VDA12 = 62.5	NDP = 0 NDP < VDA18 = N/A % < VDA18 = N/A	NDP = 0 NDP < VDA24 = N/A % < VDA24 = N/A

TNDP = 16
% TNDP < VDA = 75

MAXIMUM DRIFT POINT

NOTES:
1) INCLUDED IN THIS DATA SHEET: FT-419A, FT-419B, FT-429A, FT-429B, FT-439A, FT-439B FT-449A, FT-449B
2) CALIBRATION SPAN: 1010.8 "H2O ~ 400 mv
3) AN ACTUATION POINT EVALUATION WAS NOT DONE FOR THESE TRANSMITTERS, BECAUSE THE SETPOINT RANGES FROM 12.92 (ma) TO 40.46 (ma). THERE IS NO SPECIFIC SETPOINT TO CHOOSE.
4) DATA FOR 10/21/89 WAS EXTRACTED FROM (WR-11585).

TAG/DATE	DAYS	AS FOUND (mvdc)	AS LEFT (mvdc)	DRIFT (mvdc)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
FT-419A						
12-MAY-1989	162	N/A	500.1	-2.9	0.725	YES
21-OCT-1989	352	497.2	499.9	-2.6	0.65	YES
08-OCT-1990		497.3	99.31			
FT-419B						
12-MAY-1989	162	N/A	401.1	-6.4	1.6	YES
21-OCT-1989	352	394.7	100.65	-12.465	3.11625	NO
08-OCT-1990		88.185	401.15			
FT-429A						
12-MAY-1989	162	N/A	500	-7.6	1.9	NO
21-OCT-1989	352	492.4	501.5	-1.7	0.425	YES
08-OCT-1990		499.8	499.8			

TAG/DATE	DAYS	AS FOUND (mvdc)	AS LEFT (mvdc)	DRIFT(mvdc)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
FT-429B						
12-MAY-1989	162	N/A	201.05	-7.5	1.875	YES
21-OCT-1989	352	193.55	200.75	-3.92	0.98	YES
08-OCT-1990		196.83	501			
FT-439A						
12-MAY-1989	162	N/A	99.845	1.155	0.28875	YES
21-OCT-1989	352	101	99.65	-9.52	2.38	NO
08-OCT-1990		90.13	501.5			
FT-439B						
12-MAY-1989	162	N/A	500.2	-1.9	0.475	YES
21-OCT-1989	352	498.3	200.6	-10.9	2.725	NO
08-OCT-1990		189.7	501.4			
FT-449A						
12-MAY-1989	162	N/A	200.8	-4.7	1.175	YES
21-OCT-1989	352	196.1	401.05	-1.5	0.375	YES
08-OCT-1990		399.55	399.55			
FT-449B						
12-MAY-1989	162	N/A	499.7	-4.2	1.05	YES
21-OCT-1989	352	495.5	501.3	-4.8	1.2	YES
08-OCT-1990		496.5	100.34			

ATTACHMENT III TO IPN-93-154

STEAM LINE FLOW INSTRUMENT DRIFT ANALYSIS FOR THE FLOW TRANSMITTERS
(NEW DATA)

New York Power Authority
INDIAN POINT 3 NUCLEAR POWER PLANT
Docket No. 50-286

PROCEDURE: 3PC-R43B   TITLE: MAIN STM FLOW CHECK & CAL. (WIDE RANGE)   SYSTEM: RPC

COMPONENT: FLOW TRANSMITTERS   MANUFACTURER: FOXBORO   MODEL NUMBER: N-E11DM-HIB-2BE

VDA6 = 1.8795 (100 - 270) DAYS	VDA12 = 1.8919 (271 - 450) DAYS	VDA18 = 1.8960 (451 - 630) DAYS	VDA24 = 1.9084 (631 - 810) DAYS
NDP = 8 NDP < VDA6 = 7 % < VDA6 = 87.5	NDP = 8 NDP < VDA12 = 5 % < VDA12 = 62.5	NDP = 8 NDP < VDA18 = 8 % < VDA18 = 100	NDP = 0 NDP < VDA24 = N/A % < VDA24 = N/A

TNDP = 24
% TNDP < VDA = 83.33   MAXIMUM DRIFT POINT

NOTES:
1) INCLUDED IN THIS DATA SHEET: FT-419A, FT-419B, FT-429A, FT-429B, FT-439A, FT-439B FT-449A, FT-449B
2) CALIBRATION SPAN: 1010.8 "H2O   400 mv
3) AN ACTUATION POINT EVALUATION WAS NOT DONE FOR THESE TRANSMITTERS, BECAUSE THE SETPOINT RANGES FROM 12.92 (ma) TO 40.46 (ma). THERE IS NO SPECIFIC SETPOINT TO CHOOSE.
4) DATA FOR 10/21/89 WAS EXTRACTED FROM (WR-11585).

TAG/DATE	DAYS	AS FOUND (mvdc)	AS LEFT (mvdc)	DRIFT(mvdc)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
FT-419A						
12-MAY-1989	162	N/A	500.1	-2.9	0.725	YES
21-OCT-1989	352	497.2	499.9	-2.6	0.65	YES
08-OCT-1990	597	497.3	99.31	0.59	0.1475	YES
27-MAY-1992		99.9	99.9			
FT-419B						
12-MAY-1989	162	N/A	401.1	-6.4	1.6	YES
21-OCT-1989	352	394.7	100.65	-12.465	3.11625	NO
08-OCT-1990	597	88.185	401.15	-2.75	0.6875	YES
27-MAY-1992		398.4	401.1			
FT-429A						
12-MAY-1989	162	N/A	500	-7.6	1.9	NO
21-OCT-1989	352	492.4	501.5	-1.7	0.425	YES
08-OCT-1990	597	499.8	499.8	0.6	0.15	YES
27-MAY-1992		500.4	500.4			

TAG/DATE	DAYS	AS FOUND	AS LEFT (mvdc)	DRIFT(mvdc)	DRIFT (%CAL-SPAN)	DRIFT < VDA (YES OR NO)
FT-429B						
12-MAY-1989	162	N/A	201.05	-7.5	1.875	YES
21-OCT-1989	352	193.55	200.75	-3.92	0.98	YES
08-OCT-1990	597	196.83	501	-0.5	0.125	YES
27-MAY-1992		500.5	500.5			
FT-439A						
12-MAY-1989	162	N/A	99.845	1.155	0.28875	YES
21-OCT-1989	352	101	99.65	-9.52	2.38	NO
08-OCT-1990	597	90.13	501.5	1.6	0.4	YES
27-MAY-1992		503.1	500.2			
FT-439B						
12-MAY-1989	162	N/A	500.2	-1.9	0.475	YES
21-OCT-1989	352	498.3	200.6	-10.9	2.725	NO
08-OCT-1990	597	189.7	501.4	-0.7	0.175	YES
27-MAY-1992		500.7	500.7			
FT-449A						
12-MAY-1989	162	N/A	200.8	-4.7	1.175	YES
21-OCT-1989	352	196.1	401.05	-1.5	0.375	YES
08-OCT-1990	597	399.55	399.55	-1.5	0.375	YES
27-MAY-1992		398.05	398.05			
FT-449B						
12-MAY-1989	162	N/A	499.7	-4.2	1.05	YES
21-OCT-1989	352	495.5	501.3	-4.8	1.2	YES
08-OCT-1990	597	496.5	100.34	-5.34	1.335	YES
27-MAY-1992		95	99.8			