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December 1, 2006
Indian Point Unit No. 3
Docket No. 50-286
NL-06-123
IP-TNG-06-060

Mr. Samuel J. Collins
Regional Administrator
Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, Pennsylvania 19406-1415

Subject: Indian Point Unit 3 Initial Licensed Operator Examination Post-Examination Submittal – Facility Comments

Dear Sir:

In accordance with NUREG 1021 Revision 9, "Operator Licensing Examination Standards for Nuclear Power Reactors", Section ES-501 "Initial Post-Examination Activities," Entergy Nuclear Operations, Inc. (Entergy) is providing your Mr. David Silk the enclosed documentation for the Indian Point Energy Center Initial Reactor Operator and Senior Reactor Operator written examinations, completed on November 17, 2006.

Entergy is making no commitments in this letter. Should you have any questions regarding this matter, please contact Mr. Stephen Davis, Superintendent, Operations Training at (914) 788-2904, or Mr. Doug Huntington, Senior Instructor at (914) 788-2995.

Sincerely,

Robert Christman
Manager, Training
Indian Point Energy Center

Attachment 1: ES-501 Facility Comments and NRC Resolutions with reference material

cc:

Mr. David Silk
Chief Examiner
Region I
U.S. Nuclear Regulatory Commission

with Enclosures

Division of Reactor Safety – Region 1
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, Pa. 19406-1415

December 1, 2006

cc: Mr. David Silk, Chief Examiner

Indian Point Energy Center is requesting the following changes be made to the NRC licensing examination administered November 17, 2006 for Indian Point Unit 3.

Question #29

Given the following conditions:

The plant is being cooled down to 140°F for maintenance which will NOT require the RCS be opened. The crew is in the process of placing the first Residual Heat Removal (RHR) train in service for RCS cooling. Current RCS temperature is 345°F.

Current boron concentrations are as follows:

- RHR (train to be placed in service) boron 1020 ppm
- Required Shutdown Margin at 300°F boron 1750 ppm
- Required Shutdown Margin at 68°F boron 1800 ppm
- RCS boron 2025 ppm
- Refueling boron 2050 ppm

Before the RHR train can be placed in service for RCS cooling, RHR boron concentration must be increased by a MINIMUM of . . . .

A. 730 ppm

B. 780 ppm

C. 1005 ppm

C. 1030 ppm

Answer:
B. 780 ppm

Comment: The question asks for the minimum amount of boron concentration increase when placing RHR system in service. Procedure 3-SOP-RHR-001 (previously provided), step 4.2.2.8 states if RHR System boron concentration is less than the 68°F Cold Shutdown Boron Concentration, then the operator is directed to step 4.2.2.9, not 4.2.3. Step 4.2.2.9 g) requires the RHR boron concentration to be raised to RCS boron concentration. This would make "B" incorrect as this was the concentration to raise the RHR concentration to 68°F Cold Shutdown Boron Concentration. The correct answer is "C" which raises RHR boron concentration to the RCS boron concentration. Therefore request #29 answer be changed from "B" to "C".

NRC Resolution:

Question # 45

The Main Generator just tripped due to a pilot wire transfer trip from Buchanan. The 25X1 sync check relay which ensures synchronization between 6.9 KV buses 5 and 1/2 for the auto transfer has failed. All other circuits are intact. Which of the following describes the affect to the Reactor Coolant Pumps (RCP)?

A. Only 32 and 34 RCPs will be operating

B. Only 32 and 33 RCPs will be operating

C. Only 33 and 34 RCPs will be operating

D. Only 31 and 33 RCPs will be operating

Answer:

B. 32 and 33 RCPs will be operating

Comment: The question asks for the RCPs that will be operating if the Sync Check relay for fast bus transfer for 6.9KV Buses 1 and 2 were to fail. The question as written for the exam did not state that the 2 out of 4 Under Frequency Trip of ALL 4 RCP was disabled as discussed in System Description 28 (previously provided), pages 13 and 14. This could cause ALL four RCPs to trip due to under frequency on 2 out of 4 buses, therefore NO choice would be correct. The question is recommended for deletion since NO RCPs operating was not a choice.

NRC Resolution:

Sincerely,

Stephen Davis
Superintendent, Operations Training
Indian Point Energy Center

CAUTION

- WHEN RHR pump flow is greater than 300 gpm AND less than 1170 gpm THEN RHR pump operation should be limited to 3 hrs or less in a 24-hr period (Ref 5.2.11)
- RHR pump minimum flow SHALL be maintained greater than or equal to 100 gpm during start/stop pump operation, which is consider to be 30 min or less (Ref 5.2.11)

____ 4.2.2.4 START desired RHR pump.

____ 4.2.2.5 WAIT at least 10 min (Ref 5.2.16) to allow for proper mixing.

____ 4.2.2.6 REQUEST Chemistry to sample boron concentration.

____ 4.2.2.7 WHEN sample has been obtained, THEN STOP desired RHR pump.

____ 4.2.2.8 IF sample results indicate RHR loop boron concentration is equal to or greater than the 68°F (Ref 5.2.17) Cold Shutdown boron concentration, THEN GO TO Step 4.2.3.

____ 4.2.2.9 IF sample results indicate RHR loop boron concentration is less than RCS boron concentration AND RX Trip breakers are open, THEN:

____ a) REVIEW Unit Log to ensure motor starting requirements of 3-SOP-EL-004A, Electric Motor Operation, will be met.

____ b) START RHR Pump.

____ c) ENSURE letdown pressure as indicated on PI-135, LP Letdown Press, is less than RHR pump discharge pressure as indicated locally on PI-635, RHR Pump Discharge Pressure Indicator, by adjusting PCV-135, Low Pressure Letdown Line Backpressure Control Valve.

____ d) ENSURE a CVCS HUT is aligned to receive CVCS letdown per 3-SOP-CVCS-001, CVCS Holdup Tank Operation.

____ e) ENSURE CH-LCV-112A, VCT Inlet Diversion, is in DIVERT.

CAUTION

Letdown flow rate SHALL NOT exceed 120 gpm to prevent exceeding design flow rate of Non-Regenerative HX (NRHX) and channeling of demineralizers.

____ f) OPEN HCV-133, Resid HR LP Bypass To Demin, as necessary to establish RHR letdown flow.

____ g) REQUEST Chemistry to sample RHR periodically until RHR boron concentration is equal to or greater than RCS boron concentration.

____ 4.2.2.10 WHEN RHR boron concentration is equal to or greater than RCS boron concentration, THEN COMPLETE following:

____ a) CLOSE HCV-133, Resid HR LP Bypass To Demin.

____ b) PLACE CH-LCV-112A in AUTO.

____ c) ADJUST PCV-135 for normal letdown control.

____ d) STOP RHR Pump.

4.2.3 **RHR Shutdown Cooling Alignment and Warmup**

NOTE

An RHR train may be considered operable during alignment and operation for decay heat removal, if capable of being manually realigned to the ECCS mode of operation, LCO 3.5.3, Mode 4.

____ 4.2.3.1 ENSURE RCS is less than or equal to 350°F and 450 psig (Ref 5.2.8).

NOTE

Steps 4.2.3.2 through 4.2.3.12 can be done concurrently.

____ 4.2.3.2 ENSURE RHR boron concentration is equal to or greater than one of the following:

____ • RCS boron concentration

____ • 68°F Cold Shutdown boron concentration.(Ref 5.2.17) temperature. A single channel tripping would annunciate the "PRESSURIZER LOW PRESS CHANNEL TRIP" alarm on the SAF panel in the Control Room.

2.1.5 High Pressurizer Level Trip (Figure 28-5)

The high pressurizer level trip is provided as a backup to the high pressurizer pressure trip. If the pressurizer is maintaining pressure below the trip setpoint during a rapid insurge, the high level trip will actuate when pressurizer level is 90% of span. This prevents damage to the pressurizer relief and safety valves and discharge piping, which are designed to pass steam but not water.

Three level channels are used to sense pressurizer level and they are arranged in a two out of three logic. The protection channels are also used for control. This arrangement is allowed even though a failed level channel could result in the control system filling the pressurizer. Filling the pressurizer would also cause pressure to increase and a high pressure reactor trip would occur if no action were taken. The high pressure reactor trip would stop the pressure increase due to the level channel failure preventing water relief through the safety valves.

The high level trip is blocked below 10% power by permissive P-7. This allows plant heatup and cooldown to occur without receiving a reactor trip on high pressurizer level. The high level trip is not needed at low power due to the low level maintained by the variable pressurizer level program.

A single channel tripping would annunciate the "PRESSURIZER HIGH LEVEL CHANNEL TRIP" alarm on panel SAF in the Control Room.

2.1.6 Reactor Coolant Low Flow Trip (Figure 28-6)

The low flow trips protect the core from DNB following a failure of coolant flow to remove the heat generated by the fuel. The low flow trips are needed because the ΔT trips do not respond fast enough to ensure adequate core protection for a loss of flow event.

A loss of flow condition is sensed by four methods. They are:

- Measured flow in the reactor coolant piping,
- Detecting reactor coolant pump breaker open position,
- Sensing reactor coolant pump bus undervoltage conditions, and
- Sensing reactor coolant pump bus underfrequency conditions.

Various pump combinations are required for different power levels in order to prevent a reactor trip. They are:

- Power > P-8 - 4 Reactor Coolant Pumps
- Power > P-7 - 3 Reactor Coolant Pumps
- Power < P-7 - no pumps are required

All reactor coolant flow trips are blocked below 10% power by permissive P-7 because natural circulation is capable of cooling the core below 10% power. Administratively, all four reactor coolant pumps are required to be in operation any time the reactor trip breakers are closed (T.S. is less restrictive).

Three flow measuring circuits monitor each reactor coolant loop and are arranged in a two out of three logic. A low flow trip will occur when any two of three channels indicate that flow has decreased to 93% of normal full flow. This trip signal is used in two logic circuits. The first circuit is used to trip the reactor if power is > P-8 and flow is lost in any one loop. P-8 is activated when reactor power increases to 35%. The second logic circuit is used to trip the reactor if power is greater than or equal to 10% and flow is low in 2 or more loops. P-7 is activated when power is less than 10% blocking the low flow trips.

A single channel tripping would annunciate the "REACTOR COOLANT LOOP 31 (32,33,34) LOW FLOW CHANNEL TRIP" Alarm on the SAF panel in the Control Room.

The RCP breaker open signal is derived from a breaker auxiliary "a" contact to actuate a low flow trip signal. This trip signal is provided to anticipate probable plant transients and to avoid the resultant thermal transient. The trip signal is sent to a one out of two logic device that senses breaker position and loop flow. A breaker open signal will initiate a signal that is sent to two logic circuits to compare the flow combination with the reactor power level. These circuits are the ones described above. With power above 35% and P-8 inactive one RCP breaker open signal causes a trip; with power below P-8 and >10% AND P-7 inactive it takes two RCP trip signals to cause the trip.

The RCP undervoltage trip signal provides protection following a complete loss of power. The RCP's are powered from 6.9KV buses 1 through 4. A decrease in voltage to 75% of nominal voltage, as sensed by the undervoltage relays, initiates the signal. The four bus undervoltage relay signals are sent to a two out of four logic circuit. It requires two bus undervoltage signals to generate the undervoltage reactor trip. This signal indicates a probable loss of power and protects the core from DNB. Permissive P-7 blocks this trip below 10% power.

A sustained undervoltage condition for .5 seconds, overcurrent, underfrequency on two out of four 6.9 kV busses (1-4) or a ground condition trips the RCP breaker using a one out of four logic. These protective devices are not part of the Reactor Protection system but are used as bus stripping and motor protection devices.

The RCP underfrequency trip provides protection following a major network frequency disturbance. The four underfrequency devices are arranged in a two out of four logic. A decrease in frequency to 57.5 Hz on any two buses trips all four RCP breakers. An underfrequency condition slows down the pumps and results in reduced flow and reduced coast down time following a pump trip. Operation at reduced flows could cause you to be outside the boundaries of OPΔT and OTΔT trips which assume constant flow. In addition, the proper coast down time is required to remove reactor heat during and immediately following a reactor trip. A decrease in bus frequency can decelerate the RCP's faster than a complete loss of power. The underfrequency trip does not directly trip the reactor, the trip of the RCP breakers accomplishes the reactor trip when power is >10% (P-7).

2.1.7 Source Range High Flux Trips (Figure 28-7)

The source range high flux trip is initiated at 5×10^5 counts per second and is provided to protect against excessive power excursions caused by unexpected reactivity additions and high startup rates while in the source range. The nuclear instrumentation channels respond to these conditions first because indication of an increase in flux occurs before there are any significant changes in system process variables.

It will also protect personnel in the containment during a shutdown period while refueling and control rod testing is being performed. Two source range channels are available. Each measures flux in a separate part of the core and the reactor will trip if either high flux setpoint is reached.

The source range trips are manually blocked for normal operation at higher power levels upon receipt of permissive P-6. P-6 is derived from the intermediate range channels. This block also de-energizes the source range detector high voltages. The trips are automatically restored and the detectors are automatically re-energized when power decreases to the P-6 reset point on the intermediate range detectors. The source range high flux trips are also automatically blocked and the detectors de-energized by permissive P-10 when power levels are above 10%. The source range detectors may be re-energized and the source range trip may be manually reinstated below 10% power by simultaneous manual actuation of the "INTERMEDIATE RANGE PERMISSIVE DEFEAT" push buttons located on the flight panel (FCF). This may be required during a shutdown if an intermediate range channel fails high or compensation voltage is lost. A manual trip