POST-EXAM COMMENTS

(Green Paper)

ST. LUCIE

2008-301

Licensee Submitted Post-Exam Comments

[✓] Letter Attached With Comments

[ ] Comments Only - No Letter

[ ] Letter Stating "No Comments"

[ ] None

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FPL

August 6, 2008

Mr. Richard Baldwin
USNRC Chief Examiner, Region II
U. S. Nuclear Regulatory Commission
61 Forsyth Street, SW Suite 23T85
Atlanta, GA 30303-3415

Subject: Operator Licensing Examinations
Docket No. 50-335 & 50-389
License No. DPR-67 & NPF-16
St. Lucie Nuclear Station

In accordance with Operator Licensing Examination Standards for Power Reactors, NUREG-1021 Rev. 9, Supplement 1, ES-402, ES-403 and ES-501, Florida Power & Light St. Lucie Nuclear Plant is submitting the HLC-18 NRC written examination package for grading.

As required by ES-501, enclosed in this package are the following items:

- The Master SRO written examination (100 questions) and answer key (3 pages).
- The applicant signed examination cover sheet and the applicants original answer sheet (9 total).
- A clean copy of each applicant's answer sheet (9 total).
- Five (5) pages of questions asked by applicants with proctor responses during the administration of the written examination.
- The written examination seating chart.
- Three (3) ES-501 Attachment 1, Facility Comments and NRC Resolution sheets, each signed by an authorized facility representative, and supporting reference material.
- Written examination performance analysis.

If you have any questions concerning this examination package, please contact Mr. Joseph Milligan, Supervisor, Initial License Operator Training, at 772-467-7106 for resolution.

Sincerely,

Seth Duston
Training Manager
St. Lucie Nuclear Power Station

Question #65

Comment: The question asks for the actions to be performed when 1B2 Circulating Water Pump (CWP) trips with 1B1 CWP out of service The submitted answer is "B" is based on Unit 1 Procedure 1-0620030, "Circulating Water System," Subsequent Operator Actions, page 7, step 7.2. This question is recommended for acceptance of two answers as correct. This off-normal procedure also addresses maintaining differential temperature across the condenser < 32° F. Conditions provided in the question state Δ T across the condenser is 31° F and discharge canal temperature is 102° F.

Applicant 55-23238 submitted the following:
There were no trends provided for this question. I assumed that the values given in the stem of the question were steady state values after the plant stabilized from the transient induced by the CW pump trip. Answer A is incorrect because the plant was above 30% power so the trip requirement for backpressure is 5.5" Hg. When I looked at answer B, I read it as stating that a downpower was required in order to restore a CW pump. I saw no reason why you would need to downpower in order to restart a CW pump in this situation, so I ruled this answer out. Answer C is incorrect because the plant was less than the 2.5" Hg differential trip requirement. That left me selecting answer D – start a downpower in order to reduce the load across the remaining condenser and reduce DT less than 30 degrees. I would expect to have maintenance inspect the tripped 1B2 CW pump prior to restarting it or have the 1B1 CW pump returned to service as soon as possible.

St.Lucie position:

St. Lucie supports the following position:

In accordance with Unit 1 Procedure 1-0620030, "Circulating Water System," page 5, the off normal entry conditions are:

- One or more Circulating Water Pumps Trips
- High differential temperature (>30° F) as obtained from the Environmental System Panel (MET Panel) or computed on the RCO logs sheet

Question #65 provides conditions that exceed the expected differential temperature across a condenser (31° F). This is a valid entry condition into this off-normal operating procedure. Operators at St. Lucie are trained to take actions to reduce turbine load when condenser differential temperature exceeds 30° F.

Per Unit 1 Procedure 1-0620030, "Circulating Water System," page 13, the note for Step 9 states that the limits for condenser differential temperature and canal discharge temperature are not allowed to be exceeded UNLESS the following conditions exist:

- Condenser and/or Circulating Water Pump maintenance
- Fouling of the Circulating Water System

These two conditions do NOT apply for Question # 65. Therefore, the actions listed below for high condenser differential temperature are required to be performed. Unit 1 Procedure 1-0620030, "Circulating Water System," Subsequent Operator Actions, page 15, step 7.2.9.H states: "Control turbine power so that differential temperatures limits or discharge canal temperature limits are NOT exceeded". For this question, choice "D" is: "Begin a turbine/reactor shutdown until Δ T across the condenser is less than 30°F." Therefore, based on the above information, it is recommended that BOTH "B" and "D" are accepted as correct answers.

St. Lucie supports the recommendation to accept two answers, both "B" and "D."

Michael Bladek, Assistant Operations Manager 8/13/08 Date

NRC Resolution:

Question #70

Comment: The question asks for a condition that could result in an inaccurate or invalid calculation of RCS leakage while performing 2-OPS-01.03, "RCS Inventory Balance." This question is recommended for acceptance of two answers as correct. The submitted answer is "C". However, choice "A" (50 gallons of primary water added to Charging pump suction) would result in a dilution of the RCS, changing RCS temperature. As stated in Unit 2 procedure 2-OPS-.01.03, "Reactor Coolant System Inventory Balance," Section 2.2 Limitations, deviations from steady state conditions should be avoided to ensure accuracy of the leak rate calculation. Any of the following could result in inaccurate or invalid calculations:

- Changes in RCS temperature
- Adjustments to Quench Tank parameters

Applicant 55-23238 submitted the following:
I answered A for this question as I was certain that adding 50 gallons of primary water to the reactor would invalidate any inventory balance that was being done at the time and would cover up any potential leakage that may have been occurring. Answer B was incorrect because the charging pump seal tank level is accounted for in the inventory balance. Answer C seemed like a potential correct answer as a changing quench tank level could invalidate the calculation, but I felt that A was a more correct answer as it more directly affected actual RCS inventory. Answer D depicts a situation where no inventory is being lost – only recirced back to the VCT.

St.Lucie position:

St. Lucie supports the following position:

$$Vmu = Vrcs * \ln[(Concmu - ConcRCSi)/(Concmu - ConcRCSf)]$$

$$Vmu/Vrcs = \ln[(Concmu - ConcRCSi)/(Concmu - ConcRCSf)]$$

$$e^{(Vmu/Vrcs)} = [(Concmu - ConcRCSi)/(Concmu - ConcRCSf)]$$

$$e^{(Vmu/Vrcs)} = (ConcRCSi)/ConcRCSf)$$

$$e^{(50/66,891)} = (ConcRCSi)/ConcRCSf)$$

$$1.000747764 = (ConcRCSi)/ConcRCSf)$$

$$ConcRCSf = ConcRCSi/1.000747764$$

The initial equation above is from the addendum to the Nomograph which is attached. A similar equation is in the U2 Initial criticality following Refueling procedure 2-3200088, which is also attached.

Using the derived equation and the data from the Physic curve books supplied to the simulator, also attached, the following RCS temperature changes can be derived for BOC, at 200 EFPH and MOC, at 5000 EFPH.

BOC

HFP Critical Boron Concentration from Figure C2 of the Physics curve

1134 ppm Cb

ConcRCSf = 1134 / 1.000747764 = 1133.1527 = 1133.153

Delta Cb = 1134 -1133.153 = .847

Reactivity worth of delta Cb = .847 ppm * 7.86 pcm/ppm (from figure C.1 for 200 EFPH) = 6.657 pcm. This is a positive reactivity addition which must be offset by an equal negative reactivity addition to maintain the reactor critical.

Temperature worth of pcm (assuming only temperature and not power is changed) is as follows: to get a negative 6.657 pcm then -6.657 pcm / (-8.8 pcm/°F) (from figure C.4 for 200 EFPH) = .756°F

MOC

HFP Critical Boron Concentration from Figure C2 of the Physics curve for 5000 EFPH

678 ppm Cb

ConcRCSf = 678 / 1.000747764 = 677.493

Delta Cb = 678-677.493 = .507

Reactivity worth of delta Cb = .507 ppm * 8.33 pcm/ppm (from figure C.1 for 5000 EFPH) = 4.223 pcm. . This is a positive reactivity addition which must be offset by an equal negative reactivity addition to maintain the reactor critical.

Temperature worth of pcm (assuming only temperature and not power is changed) is as follows: to get a negative 4.223 pcm, then -4.223pcm / (-15.8 pcm/°F) (from figure C.4 for 5000 EFPH) = .267°F

Per 2-OSP-01.03, page 6, operators are required to record initial and final readings of Tcold in° F, with a note that requires Tcold be maintained constant (+/- 0° F). At St. Lucie, Tcold indications are measured and displayed in tenths of degrees.

Therefore, based on the above information, it is recommended that BOTH "A" and "C" are accepted as correct answers.

St.Lucie supports the recommendation to accept two answers, both "A" and "C."

Michael Bladek, Assistant Operations Manager Date 8/13/08

NRC Resolution:

Question #95

Comment: This question asks for actions required to be taken once a Secondary Chemistry Action Level 2 excursion occurs. Although no applicant submitted comments on this question, the examination analysis determined that this question had a 44 % success rate, with 4 of 5 applicants who missed this question selecting "A" as the correct answer.

St.Lucie position:

St. Lucie supports the following:
Unit 1 procedure 1-0610030, "Secondary Chemistry – Off Normal," Section 5.3.6 Subsequent Actions, states that following a Level 2 excursion, excluding dissolved oxygen, consideration should be given to further reductions in power and a low power or hot soak to promote removal of the specific contaminant from the S/G. Therefore, based on the above information, it is recommended that BOTH "A" and "C" are accepted as correct answers.

Michael Bladek, Assistant Operations Manager 8/13/08
Date

NRC Resolution: