P.O. Box 63
Lycoming, New York 13093

Constellation Energy Group

Nine Mile Point Nuclear Station

November 1, 2002
NMP-97953

Mr. Hubert J. Miller
Regional Administrator
USNRC Region I
475 Allendale Road
King of Prussia, PA 19406

Attention: Mr. John Caruso

Subject: Nine Mile Point Nuclear Station Unit 1 Post Written Examination Activities – Amendment 1

Dear Mr. Miller:

Following conversations with Mr. John Caruso, and as recommended by Mr. Richard Conte, we submit this Amendment 1 to our original Post Written Examination Activities submittal (re: letter NMP-97941, dated October 18, 2002).

Nine Mile Point has conducted a re-analysis of written examination question RO 052 / SRO 054. Our original analysis proved to be inadequate; it failed to positively identify the actual flaw in the approved question. As such, we did not enable the NRC to conduct an objective review and render a legitimate decision regarding our recommended disposition for the question. The re-analysis is included here for your review and consideration.

Per Mr. John Caruso's request, we are mailing a copy of this amendment to Mr. Dave Muller at NRC Headquarters, for his review as well.

We appreciate your patience in this matter and look forward to the results of your review.

If you have any questions, please call Ron Thurow, General Supervisor Operations Training, at 315-349-1182.

Sincerely,

Michael T. Navin
Manager Nuclear Training

NMP1 License Class LC1-0101
NRC INITIAL WRITTEN EXAMINATION POST-EXAMINATION ANALYSIS –
AMENDMENT 1

SUMMARY:

Per NUREG-1021, Revision 8, Sections ES-402 and ES-501, we submit the following amended NRC INITIAL WRITTEN EXAMINATION POST-EXAMINATION ANALYSIS for your review and consideration.

We propose that the following questions be DELETED from the RO examination:

QUESTION	BASES	NUMBER OF AFFECTED APPLICANTS
RO 015	No correct answer	4 of 4 RO's
RO 052 SRO 054	No correct answer	7 of 9 RO's/SRO's
RO 090	No correct answer	4 of 4 RO's

We propose that the following question has TWO CORRECT ANSWERS:

QUESTION	CAUSE	NUMBER OF AFFECTED APPLICANTS
RO 059 SRO 062	Insufficient stem conditions	7 of 9 RO's/SRO's

We propose that the following question has ONLY ONE CORRECT ANSWER, BUT it is NOT the answer approved by the NRC:

QUESTION	CAUSE	NUMBER OF AFFECTED APPLICANTS
RO 054	Technical error	4 of 4 RO's

NOTE: This amended submittal includes only the re-analyzed question, RO 052 / SRO 054.

NMP1 License Class LC1-0101
NRC INITIAL WRITTEN EXAMINATION POST-EXAMINATION ANALYSIS – **AMENDMENT 1**

PART 1

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	223001	223001
	Importance Rating	3.0	3.1

Proposed Question: **RO 052, SRO 054**

A loss of Instrument Air to the CAM and H_2-O_2 Monitors has occurred.

Which one of the following describes the response of the sample stream isolation valves, and the required alternate method for monitoring the primary containment atmosphere?

	RESPONSE OF SAMPLE STREAM IVs	ALTERNATE MONITORING METHOD
A.	Fail open	Channel 12 H_2-O_2 local indication
B.	Fail open	Channel 12 H_2-O_2 Control Room indication
C.	Fail closed	Drywell PASS sample
D.	Fail closed	Torus PASS sample

Proposed Answer: **A**

Justification:	**A** is correct – Per SOP-6. **B** is incorrect – cal gas IVs fail closed; therefore no control room indication is valid. **C/D** are incorrect – sample IVs fail open, and although SOP-6 suggests a PASS (if desired), it still requires monitoring Ch. 12 locally.

Proposed references to be provided to applicants during examination: None

Technical Reference(s):		N1-SOP-6	
K/A:	223001 Primary Containment System and Auxiliaries	K1.10, Knowledge of the physical connections and/or cause- effect relationships between PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES and the following: Plant air systems	
10 CFR Part 55 Content:		55.41(7)	**X**
		55.43	
		55.45	

Question Source:	Bank #	**X12473**
	Modified Bank #	
	New	
	History	

Question Cognitive Level:	Memory or Fundamental Knowledge	**X**
	Comprehension or Analysis	
	LOD:	**2**

NMP1 License Class LC1-0101
NRC INITIAL WRITTEN EXAMINATION POST-EXAMINATION ANALYSIS –
AMENDMENT 1

PART 2

JUSTIFICATION FOR CHANGE:

Analysis:

A lack of stem focus resulted in there being no correct answer to this question.

The use of the label 'sample stream isolation valves' in the stem and in the heading for the left-column portion of the choices is inappropriate. No such valves, by this name, exist in either the CAM or H2-02 Analyzer systems; nor does Table 6.1 of N1-SOP-6 allude to any valves by this name.

Additionally, an applicant could argue that any one of 3 groups of system-related valves could be interpreted as 'sample stream isolation valves.' Those 3 groups are:

1. The primary containment isolation valves for the CAM system, as well as System 11 of H2-O2 monitoring. These valves are cited in the 1st bullet of the EFFECT column of N1-SOP-6, Table 6.1. As the 1st bullet illustrates, ***these valves all fail closed on a loss of air.***

2. The primary containment isolation valves for System 12 of H2-O2 monitoring. These are DC-operated valves, and so are unaffected by the loss of air; i.e., ***they have no response to a loss of air.***

3. The H2-O2 inlet sample valves for System 11 and System 12 H2-O2 monitoring. These valves are cited in the 3rd bullet of the EFFECT column of N1-SOP-6, Table 6.1. As the 3rd bullet illustrates, ***these valves all fail open on a loss of air.***

Conclusions:

The question stem failed to clearly present the question to the applicants and ignored the influence of the System 12 H2-O2 monitoring isolation valves (DC-operated) on the set of answer choices. Consequently, we cannot defend any of the 4 choices as the only correct answer while defending the other 3 choices as distractors.

RECOMMENDATION:

There being no correct answer, delete question RO 052 / SRO 054 from both the RO and SRO exams.

OPERATIONS BRANCH CONCURRENCE: _____ (Signature) 11/1/02 (Date)

OPERATIONS TRAINING SUPERVISION : _____ (Signature) 11/1/02 (Date)

PART 3

SUPPORT DOCUMENTATION

- Drawing C-18014-C, sheet 2
- Drawing C-26939-C
- Drawing C-26949-C
- N1-SOP-6, Table 6.1

NMP1 License Class LC1-0101
NRC INITIAL WRITTEN EXAMINATION POST-EXAMINATION ANALYSIS

SUMMARY:

Per NUREG-1021, Revision 8, Sections ES-402 and ES-501, we submit the following NRC INITIAL WRITTEN EXAMINATION POST-EXAMINATION ANALYSIS for your review and consideration.

We propose that the following questions be DELETED from the RO examination:

QUESTION	BASES	NUMBER OF AFFECTED APPLICANTS
RO 015	No correct answer	4 of 4 RO's
RO 090	No correct answer	4 of 4 RO's

We propose that the following questions have TWO CORRECT ANSWERS:

QUESTION	CAUSE	NUMBER OF AFFECTED APPLICANTS
RO 052 SRO 054	Lacks stem focus	7 of 9 RO's/SRO's
RO 059 SRO 062	Insufficient stem conditions	7 of 9 RO's/SRO's

We propose that the following question has ONLY ONE CORRECT ANSWER, BUT it is <u>NOT</u> the answer approved by the NRC:

QUESTION	CAUSE	NUMBER OF AFFECTED APPLICANTS
RO 054	Technical error	4 of 4 RO's

Per the requirements of ES-402, Section E.5, the following pages provide the analyses, justification for change, and our recommended disposition for each of these questions.

We present each of these questions in the following format:

PART 1 - The original question as approved by the NRC and administered to the applicants

PART 2 - The justification for change, including an Analysis, Conclusions, and the specific Recommendation

PART 3 - A copy of the reference documentation that supports the recommended change

NMP1 License Class LC1-0101
NRC INITIAL WRITTEN EXAMINATION POST-EXAMINATION ANALYSIS

PART 1

Examination Outline Cross-reference:	Level	RO	
	Tier #	1	
	Group #	1	
	K/A #	295001	
	Importance Rating	3.1	

Proposed Question: **RO 015**

The plant is operating at 100% power, with the following:

- A malfunction results in a lowering speed on all five running Recirculation Pumps
- Operator action has been taken to stop the lowering flow
- Operation remains outside the Restricted Zone on the Power to Flow Map

Which one of the following describes the effect of this flow reduction on the APRM margins to rod blocks and scrams?

A. The same margins exist now as before and the margins will remain constant.

B. Lesser margins exist now than before and these margins will remain constant.

C. Lesser margins exist now than before and these margins will become even less.

D. Greater margins exist now than before but these margins will return to the original margins.

Proposed Answer: **C**

Justification:	**C** is correct - FCTR curves the setpoints downward to avert the scram zone and the lowering FW temperature will continue to raise power. **A/B/D** are incorrect - wrong direction

Proposed references to be provided to applicants during examination: None

Technical Reference(s):		DDC1E00135, Five Loop Power Flow Map	
K/A:	295001 Partial or Complete Loss of Forced Core Flow Circulation	AA2.02, Ability to determine and/or interpret the following as they apply to PARTIAL OR COMPLETE LOSS OF FORCED CORE FLOW CIRCULATION: neutron monitoring	
10 CFR Part 55 Content:		55.41(7)	**X**
		55.43	
		55.45	

Question Source:	Bank #	
	Modified Bank #	
	New	NEW
	History	

Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	**X**
	LOD:	**3**

Comments: None

PART 2

JUSTIFICATION FOR CHANGE:

Analysis:

The question has two major flaws:

1. The stem conditions do not indicate how far recirc flow actually lowers, nor does it indicate the initial flow or rod line, before the operator successfully stops the flow reduction. The stem's 3rd bullet only states that wherever the flow reduction stopped, operation remains outside the Restricted Zone. As a result, more than one answer can exist, dependent upon where "outside of the restricted zone" the applicant chose to assume.

   Consider one possible scenario: Flow begins at 67.5 Mlb/hr (100% flow) and the operator stops the flow reduction at 47.25 Mlb/hr (70% flow). Referring to the Power to Flow Map...

   a) Operation does indeed remain outside the Restricted Zone; however,

   b) During this flow reduction transient, the margins to both the APRM Scram (scram setpoint line) and the APRM Rod Block (rod block setpoint line) have become GREATER, not the 'Lesser', as alleged in the approved answer.

   Consider a second possible scenario: Flow begins at 67.5 Mlb/hr (100% flow) and the flow reduction is stopped at 33.75 Mlb/hr (50% flow). Referring to the Power to Flow Map...

   a) Again, operation remains outside the Restricted Zone; however,

   b) While the margins became GREATER at first, they became LESSER after flow reached approximately 44 Mlb/hr (approximately 66% flow).

2. The second flaw: the question does not include a time frame for the end point of the transient; thus it fails to consider how the Xenon build-up (a consequence of the recirc flow induced down-power transient) contributes to the overall core reactivity change.

   As correctly described in the original question's 'Justification' section, regardless of where the recirc flow reduction stops, power will then slowly rise as the reduced feedwater inlet temperature contributes positive reactivity via the Negative Temperature Coefficient. This reactivity contributor affirms the approved answer's statement that "...margins will become even less." [Note: This response has been demonstrated repeatedly in the Unit 1 simulator.]

   Conversely, however, if one were to continue to observe the Power to Flow Map relationship for some additional amount of time after the flow transient, power would eventually turn. That is, power would at least stop rising and even begin lowering again (if post-transient Xenon's negative reactivity is sufficient to overcompensate for the feedwater inlet temperature's positive reactivity addition).

Conclusions:

None of the 4 choices correctly answers the question, in its entirety; i.e., how the margins behave during the flow reduction, and how they behave after the flow reduction.

All 3 of choices B, C, and D can correctly answer the first part of the question (i.e., the margin response during the flow reduction). This has occurred because the facility failed to identify the initial

flow (or rod line), the flow value at which the transient stopped and did not frame the question stem within a time-line.

For example, the question could have been written as:

> *The plant is operating at 100% power and 100% flow, with the following:*
>
> - *A malfunction occurs resulting in a reduction in core flow*
> - *Operator actions stops the flow reduction at 44 Mlbm/hr*
>
> *"Which one of the following describes the effect of this flow reduction on the APRM margins to rod block and scrams **during** the transient and for **10 minutes, thereafter**?"*
>
> The correct answer would have been:
>
> *"The margins become significantly LARGER, then significantly SMALLER, during the transient; they continue to become SMALLER after the transient."*

RECOMMENDATION:

On the basis of there being NO CORRECT ANSWER, delete question RO 015 from the RO examination.

OPERATIONS BRANCH CONCURRENCE: _____ 10/17/02
Signature Date

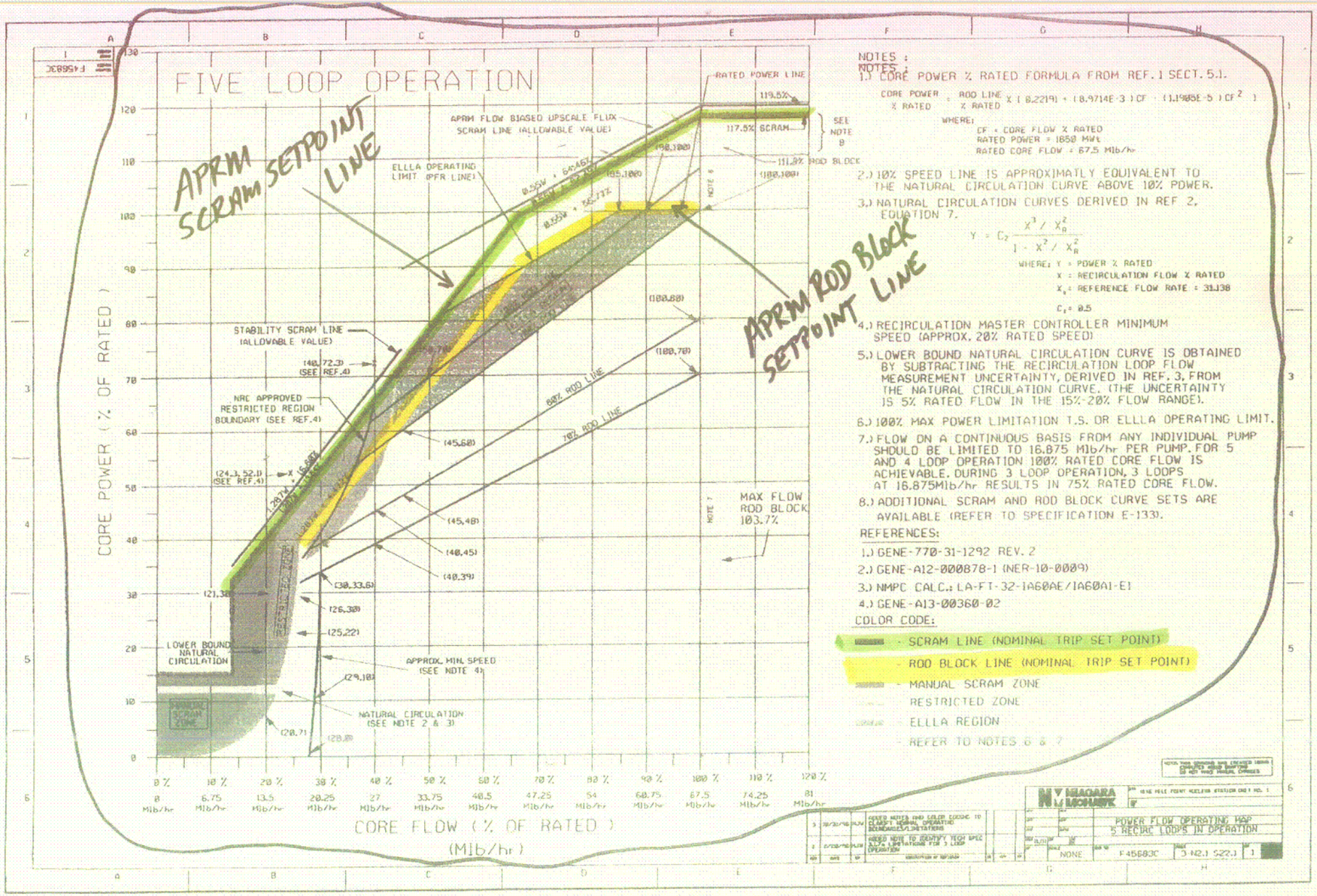
OPERATIONS TRAINING SUPERVISION: _____ 10/17/02
Signature Date

PART 3

SUPPORT DOCUMENTATION

- 5-LOOP POWER-TO-FLOW MAP (DRAWING # F-45683-C, Sheet 1)

CHANGE TO:



NOTES :

1.) CORE POWER % RATED FORMULA FROM REF. 1 SECT. 5.1.

$$\text{CORE POWER \% RATED} = \text{ROD LINE \% RATED} \times [\,8.2219 + (8.9714E\text{-}3)\,CF - (1.1985E\text{-}5)\,CF^2\,]$$

WHERE:
CF = CORE FLOW % RATED
RATED POWER = 1850 MWt
RATED CORE FLOW = 67.5 Mlb/hr

2.) 10% SPEED LINE IS APPROXIMATLY EQUIVALENT TO THE NATURAL CIRCULATION CURVE ABOVE 10% POWER.

3.) NATURAL CIRCULATION CURVES DERIVED IN REF 2, EQUATION 7.

$$Y = C_2 \frac{X^3 / X_R^2}{1 - X^2 / X_R^2}$$

WHERE: Y = POWER % RATED
X = RECIRCULATION FLOW % RATED
X_R = REFERENCE FLOW RATE = 31.138
C_2 = 0.5

4.) RECIRCULATION MASTER CONTROLLER MINIMUM SPEED (APPROX. 20% RATED SPEED)

5.) LOWER BOUND NATURAL CIRCULATION CURVE IS OBTAINED BY SUBTRACTING THE RECIRCULATION LOOP FLOW MEASUREMENT UNCERTAINTY, DERIVED IN REF. 3, FROM THE NATURAL CIRCULATION CURVE. (THE UNCERTAINTY IS 5% RATED FLOW IN THE 15%-20% FLOW RANGE).

6.) 100% MAX POWER LIMITATION T.S. OR ELLLA OPERATING LIMIT.

7.) FLOW ON A CONTINUOUS BASIS FROM ANY INDIVIDUAL PUMP SHOULD BE LIMITED TO 16.875 Mlb/hr PER PUMP. FOR 5 AND 4 LOOP OPERATION 100% RATED CORE FLOW IS ACHIEVABLE. DURING 3 LOOP OPERATION, 3 LOOPS AT 16.875Mlb/hr RESULTS IN 75% RATED CORE FLOW.

8.) ADDITIONAL SCRAM AND ROD BLOCK CURVE SETS ARE AVAILABLE (REFER TO SPECIFICATION E-133).

REFERENCES:

1.) GENE-770-31-1292 REV. 2
2.) GENE-A12-00878-1 (NER-10-0009)
3.) NMPC CALC.: LA-FT-32-1A60AE/1A60A1-E1
4.) GENE-A13-00360-02

COLOR CODE:

- SCRAM LINE (NOMINAL TRIP SET POINT)
- ROD BLOCK LINE (NOMINAL TRIP SET POINT)
- MANUAL SCRAM ZONE
- RESTRICTED ZONE
- ELLLA REGION
- REFER TO NOTES 6 & 7

NIAGARA MOHAWK — NINE MILE POINT NUCLEAR STATION UNIT NO. 1

POWER FLOW OPERATING MAP
5 RECIRC LOOPS IN OPERATION

NONE | F45683C | (5-N2.) 522.1 | 1

DDC #1E00135 PAGE 3 OF 7

PART 1

Examination Outline Cross-reference:	Level	RO	
	Tier #	3	
	Group #		
	K/A #	2.1.31	
	Importance Rating	4.2	

Proposed Question: **RO 090**

The plant is operating at 100% power, with the following:

- 11 FW FCV is in MANUAL
- 13 FW FCV is in BAL
- RPV level is 73 inches and stable
- Then, power is reduced to 90%
- After the power transient, RPV level is 73 inches and stable

Which one of the following describes the response of the 13 FW FCV indication during the RPV level transient?

A. Deviation meter first swings **right**, then swings **left**, and stabilizes **at** the center.

B. Deviation meter first swings **left**, then swings **right**, and stabilizes to the **left** of center.

C. Demand meter first swings **right**, then swings **left**, and stabilizes at a value **lower** than before the transient.

D. Demand meter first swings **left**, then swings **right**, and stabilizes at a value **greater** than before the transient.

Proposed Answer: **A**

Justification:	**A** is correct - During steady state (zero level error signal), the deviation meter is kept 'balanced' at the center of the meter scale (i.e., @ the 'zero deviation' or red dot position on the scale). When the downpower begins, the deviation meter swings to the right, because a positive level error exists, causing the FCV to be open more than is required for the now lowering steam flow and feed flow demands. As the transient comes to an end, the deviation meters swings left, back towards the center (zero level error position) and stabilizes there. RPV water level is back to its pre-transient value. **B** is incorrect - See 'A' justification. Additionally, with the 13 FCV in BAL (i.e., automatic mode), the controller deviation will return to zero (i.e., centered). **C/D** are incorrect - 'C' is a very plausible distractor because the demand meter does indeed also move during the transient. However, with a lowering feed flow requirement during the downpower, the demand meter swings left of its pre-transient value and stablizes at some lower value (i.e., this lower value is a result of a demand signal to the FCV, itself, that positions the valve less open than it was before (to accommodate the lower feed flow that is now required)). The demand meter has no reason to swing back toward its pre-transient value, because, indeed, the controller stabilizes with there being a lower demand signal sent to the FCV. This same discussion (a mirror image) justifies why 'D' is incorrect.

Proposed references to be provided to applicants during examination: None

Technical Reference(s):		O1-OPS-001-259-1-02	
K/A:	Generic 2.1.31	2.1.31: Ability to locate control room switches, controls and indications and to determine that they are correctly reflecting the desired plant lineup	
10 CFR Part 55 Content:		55.41(7)	X
		55.43	
		55.45	

Question Source:	Bank #	
	Modified Bank #	
	New	X
	History	

Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	X
	LOD:	2

PART 2

JUSTIFICATION FOR CHANGE:

Analysis:

This question is technically incorrect. None of the choices represents the actual response of the GEMAC controller indications for FCV 13 during the described level transient.

The correct answer should have been:

"Deviation meter swings to the right and remains there."

[Note: For this analysis, the facility has proven this behavior, repeatedly, in the Unit 1 simulator.]

PART 3 of this justification shows a photo of this GEMAC controller. Presently, this controller is operating in an automatic mode, as indicated by the manual control knob being in the BAL ('Balance') position. Observe, there are two horizontally oriented meters: the upper is the DEVIATION meter, the lower is the DEMAND meter. Notice the large dot at center of scale on the DEVIATION meter, and notice how the pointer is presently positioned at center. This condition represents a 'Zero deviation' that presently exists between two control signals: between the automatic control signal (coming into this GEMAC controller from the feedwater Master Level Controller, located on the control room E Panel) and the manual control signal that is developed within the GEMAC controller. In other words, these two signals currently have equal values (e.g., they are both 8 mA signals); we speak of them as being 'matched'. Unit 1 operators (and operating procedures) most often refer to this GEMAC controller as being 'balanced'.

PART 3 of this justification also excerpts Section F.5.0 of N1-OP-16 (Feedwater). This section describes how the operator places this GEMAC controller in MANUAL mode. The nulling effort ensures a 'bumpless transfer' between the automatic and manual modes of controlling FCV 13 position.

The stem of this question describes a 10% down-power transient from an initially 'balanced' (centered) FCV 13 controller operating in automatic (BAL position of the knob). As steam flow demand lowers so, too, does feed flow demand. The Master Level Controller (MLC) is attempting to maintain reactor water level at the setpoint that the operator has dialed in at the E Panel. To accomplish this, the MLC output signal to the FCV 13 GEMAC controller gets smaller. This signal simply passes through the GEMAC controller on its way to the FCV 13 positioner (at the valve location). However, because the GEMAC controller is not capable of automatically changing its internal 'manual' mode signal to remain 'matched' (in size) with the automatic signal coming from the MLC, the DEVIATION meter begins to swing to the right of center. This 'positive' deviation, or positive error, is a measure of the difference in signal size between the automatic signal and manual mode signal. After the flow/level transient, FCV 13 will remain in its new position (more closed than before) as determined by the smaller automatic signal size from the MLC. However, until the operator physically adjusts the GEMAC controller knob to, again, null out ('balance') the two signals, the DEVIATION meter indication will remain to the right of center.

Conclusions:

We have not revisited choices C and D in our analysis. These two distractors were, and still are, incorrect, for the reasons described in the 'Justification' section of the original question

However, choices A and B are also incorrect, for the reasons described in the above Analysis.

NMP1 License Class LC1-0101
NRC INITIAL WRITTEN EXAMINATION POST-EXAMINATION ANALYSIS

RECOMMENDATION:

On the basis of there being NO CORRECT ANSWER, delete question RO 090 from the RO examination.

OPERATIONS BRANCH CONCURRENCE: _____ 10/17/02
Signature Date

OPERATIONS TRAINING SUPERVISION: _____ 10/17/02
Signature Date

PART 3

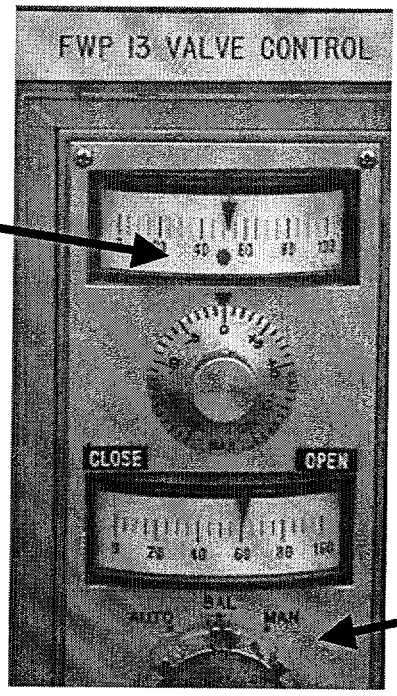
SUPPORT DOCUMENTATION

- Photo of FCV 13 GEMAC controller
- N1-OP-16, Section F.5.0, page 58

FCV 13 GEMAC CONTROLLER

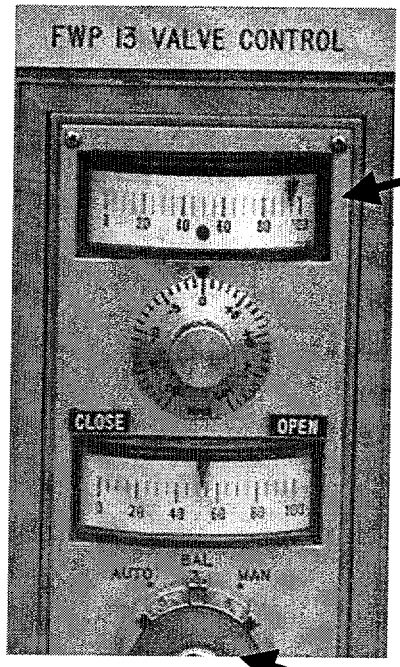
DEVIATION meter – currently at center, or 'Balanced' ('nulled')

Photo taken <u>before</u> the level transient



Select Knob (OUTER RING TYPE) - currently in the BAL position (automatic mode of controller operation)

Photo taken <u>after</u> the level transient



Notice how deviation meter pointer has swung to the right

Manual Adjust Knob (INNER KNOB TYPE) – used for nulling the controller

F. NORMAL OPERATION (Cont)

5.0 Placing FWP 13 CONTROLLER (RMC-29-158) in MANUAL

NOTE: Monitor and maintain REACTOR WATER LEVEL stable while performing the following steps.

5.1 Verify MCPR >1.59. . . . . (__)

5.2 Verify FWP 13 VALVE CONTROL M/A station in BAL. . . . . (__)

5.3 Null FWP 13 VALVE CONTROL by adjusting manual knob on FWP 13 VALVE CONTROL M/A Station until deviation meter reads 50% (RED DOT). . . . . (__)

NOTE: The following step will result in REACTOR WATER LEVEL being controlled from the M/A station of FWP 13 VALVE CONTROL.

5.4 Place FWP 13 VALVE CONTROL M/A station mode switch in MANUAL. . . . . (__)

5.5 Control reactor vessel water level by one of the following means:

- Adjusting output of FWP 11 VALVE CONTROL with manual control knob . . . . . (__)
- Adjusting output of FWP 12 VALVE CONTROL with manual control knob . . . . . (__)
- Adjusting output of FWP 13 VALVE CONTROL with manual control knob . . . . . (__)

5.6 Place FEEDWATER MASTER CONTROL LBS/HR (CTRL-(E)ID66) in MANUAL. . . . . (__)

PART 1

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	223001	223001
	Importance Rating	3.0	3.1

Proposed Question: **RO 052, SRO 054**

A loss of Instrument Air to the CAM and H_2-O_2 Monitors has occurred.

Which one of the following describes the response of the sample stream isolation valves, and the required alternate method for monitoring the primary containment atmosphere?

	RESPONSE OF SAMPLE STREAM IVs	**ALTERNATE MONITORING METHOD**
A.	Fail open	Channel 12 H_2-O_2 local indication
B.	Fail open	Channel 12 H_2-O_2 Control Room indication
C.	Fail closed	Drywell PASS sample
D.	Fail closed	Torus PASS sample

Proposed Answer: **A**

Justification:	**A** is correct – Per SOP-6. **B** is incorrect – cal gas IVs fail closed; therefore no control room indication is valid. **C/D** are incorrect – sample IVs fail open, and although SOP-6 suggests a PASS (if desired), it still requires monitoring Ch. 12 locally.

Proposed references to be provided to applicants during examination: None

Technical Reference(s):		N1-SOP-6	
K/A:	223001 Primary Containment System and Auxiliaries	K1.10, Knowledge of the physical connections and/or cause- effect relationships between PRIMARY CONTAINMENT SYSTEM AND AUXILIARIES and the following: Plant air systems	
10 CFR Part 55 Content:		55.41(7)	**X**
		55.43	
		55.45	

Question Source:	Bank #	**X12473**
	Modified Bank #	
	New	
	History	

Question Cognitive Level:	Memory or Fundamental Knowledge	**X**
	Comprehension or Analysis	
	LOD:	**2**

PART 2

JUSTIFICATION FOR CHANGE:

Analysis:

A lack of stem focus (including an inappropriate choice of words) allowed the applicants to choose between two answers, A and C.

The stem condition alludes to a loss of instrument air to both the CAM and H2-O2 Monitors. This is consistent with Table 6.1 of N1-SOP-6, Instrument Air Failures. On page 4 of that table, it addresses the response of both.

The first bullet of the EFFECT column states that the CAM system (understood to be both channels 11 and 12) and H2-O2 (channel 11 only) become inoperable. We find the valves listed for this bullet on drawing C-18014-C, sheet 2. These valves do indeed fail closed, isolating these sample streams. Channel 12 H2-O2 operability is unaffected by the loss of air. This is because these isolation valves are DC operated (not air operated). They, too, can be found on C-18014-C, sheet 2.

The third bullet of the EFFECT column states that the "H2-O2 inlet sample valves" fail open. The valves listed for this bullet are found on drawings C-26939-C and C-26949-C. Notice, these valves belong to both H2-O2 channels 11 and 12. These are the valves located at the respective sample sinks.

The NOTE in the ACTION column of the table is misleading. It claims that "all H2-O2 sample steams are open," but really means that all channel 12 H2-O2 sample streams are open. The NOTE is intended to amplify the comment just above it, explaining that channel 12 is capable of being monitored locally ('all streams'; i.e., all primary containment sample paths, of channel 12).

The lead-in statement of the stem inappropriately uses the phrase..."CAM and H2-O2 Monitors...". This leads the applicant to conclude that the answer choices will consider the response of the sample stream valves for both the CAM and H2-O2 Analyzer systems. This conclusion is validated for the applicant by the fact that the question stem, itself, neglects to focus on one of these systems, or the other.

Conclusions:

Given the stem construction of this question, an applicant could justify choice A as the correct answer for the following reasons:

1. With respect to the left-column of choice A: Channel 12 H2-O2 sample stream valves at the sample sink fail open on loss of air, and the channel 12 H2-O2 sample stream containment IVs remain open because they are DC-operated valves.

2. With respect to the right-column of choice A: Per SOP-6, Table 6.1 ACTION, channel 12 H2-O2 is to be monitored locally.

Given the stem construction of this question, an applicant could justify choice C as the correct answer for the following reasons:

1. With respect to the left-column of choice C: All CAM system sample stream valves fail closed on a loss of air.

2. With respect to the right-column of choice C: Per SOP-6, Table 6.1 ACTION, drywell PASS sampling is available.

RECOMMENDATION:

Accept two answers for question RO 052 / SRO 054. Those answers are: A and C.

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PART 3

SUPPORT DOCUMENTATION

- Drawing C-18014-C, sheet 2
- Drawing C-26939-C
- Drawing C-26949-C
- N1-SOP-6, Table 6.1

TABLE 6.1 (Cont)

RECOVERY FROM LOSS OF INSTRUMENT AIR

SYSTEM	EFFECT	ACTION
H2-O2 Mon AND CAM	• CAM and H2-O2 channel 11 inoperable, The following isolation valves close: 201.7-02, 201.7-03, 201.7-04, 201.7-5, 201.7-09, 201.7-10, 201.7-11 • Control Room H2-O2 indication invalid, calibration gas isolation valves 201.2-170 and 201.2-283 close • H2-O2 inlet sample valves 201.2-141, 201.2-142, 201.2-143, 201.2-251, 201.2-253, and 201.2-254 open.	Contact chemistry if PASS sample of drywell desired. Monitor channel 12 H2-O2 locally (TB EL 291). NOTE: All H2-O2 sample streams are open.
Service Water	• TCV 72-146 (RBCLC supply) and • TCV 72-147 (TBCLC supply) fail open	Manually control TCV 146 per N1-OP-11 (RB EL 281). Manually bypass TCV 147 per N1-OP-24.
Main Turbine	• Automatic exhaust hood spray valve close. • Turning gear normal engagement mechanism inoperable.	Operate exhaust hood spray bypass MOV -7. Manually engage turning gear , when required for turbine shutdown.
Fire Protection	• Diesel Fire Pump starts. • Transformer T-1 (Zone WD 8131) automatic detection disabled. Valves 100-521 and 95-126B fail as is, PS 100-141 alarms. • Transformer T-10 (Zone WD 8141) automatic detection disabled. Valves 100-520 and 95-127B fail as is, PS 100-142 alarms. • Transformer 101S (Zone WD 8092) automatic detection disabled. Valves 100-518 and 95-125B fail as is, PS 100-143 alarms. • Transformer 101N (Zone WD 8082) automatic detection disabled. Valves 100-519 and 95-124B fail as is, PS 100-144 alarms. • Hydrogen Rack (Zone WD 8042) automatic detection disabled. Valves 100-145 and 95-123B fail as is, PS 100-145 alarms.	Monitor Diesel Fire Pump operation AND fuel consumption. NOTE: Fire Protection System effects may NOT be immediate during a loss of air due to installed air reservoirs. Acknowledge associated Fire Panel Trouble Alarms. Inform Fire department to investigate AND station appropriate compensary fire patrols as required.

PART 1

Examination Outline Cross-reference:	Level	RO	SRO
	Tier #	2	2
	Group #	1	1
	K/A #	259002	259002
	Importance Rating	3.5	3.6

Proposed Question: **RO 059, SRO 062**

The plant is operating at 100% power, with the following:

- Feedwater Pumps 11 and 13 are running
- A fuse blows in the FCV 13 control circuit (loss of control signal)

Which one of the following describes the FCV 13 valve response and the response of its position indication on the F Panel?

	VALVE	POSITION INDICATION
A.	Fails as is	Fails as is
B.	Fails as is	Fails upscale
C.	Fails open	Fails as is
D.	Fails open	Fails upscale

Proposed Answer: **A**

Justification:	**A** is correct - Loss of control signal results in FCV lockup (remains in its current position); M/A station position indication does the same. **B/D** are incorrect - Although FCV (valve itself) locks up, the position indication fails upscale when AC power is loss to the FCV 13 positioner, itself (not a control signal type of failure). **C** is incorrect - FCV locks up in place.

Proposed references to be provided to applicants during examination: None

Technical Reference(s):		N1-ARP-H3-4-6	
K/A:	259002 REACTOR WATER LEVEL CONTROL SYSTEM	K4.13 Knowledge of REACTOR WATER LEVEL CONTROL SYSTEM design feature(s) and/or interlocks which provide for the following: FWRV lockup	
10 CFR Part 55 Content:		55.41(7,10)	X
		55.43	
		55.45	

Question Source:	Bank #	
	Modified Bank #	
	New	NEW
	History	

Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	X
	LOD:	2

PART 2

JUSTIFICATION FOR CHANGE:

Analysis:

This question's stem conditions lack the precision needed to justify choice A (the approved answer) as the only correct answer.

Notice the second bullet:

> The reference to a fuse blowing, that ultimately causes a..."loss of control signal", leaves the applicant with the option of deciding which fuse has blown.

PART 3 of this justification includes drawing # C-23077-C, Sheet 4. Notice the ballooned portion of this drawing. There, you will find two fuses that are the subject of this dilemma: FU-16 and FU-18.

Notice that fuse FU-16 supplies 120 VAC RPS Bus 11 power to the I / I Signal Conditioner. Notice, also, the wire arriving at Terminal 5 of the Signal Conditioner. This is the Feedwater FCV 13 "control signal" alluded to in the 2nd bullet of the stem conditions.

If the applicant decides that FU-16 has blown, then we observe two things...

1. The 120 VAC operating power to the Signal Conditioner has been lost, making it impossible for the "control signal" to pass through the conditioner. In other words, we have the "loss of control signal" alluded to in the stem.

   Anything that interrupts the FCV 13 "control signal" causes the valve to "Fail As Is". This VALVE status is the left-column portion of this question's answer choices, A and B.

2. Although the control signal is lost, FU-16 does not interrupt 120 VAC RPS Bus 11 power to Power Supply 29-136, PWRS. Notice that FU-18 is the fuse that supplies that power.

   Notice that the PWRS is the Feedwater Level Control System's (FWLC) internal power source to the Valve Position Indicator, POI-29-134 (from PWRS Terminal 7). This position indicator is the one alluded to in the right-column portion of this question's answer choices, A and B.

   Because this position indicator is still powered, it too will "Fail As Is" when the VALVE itself "Fails As Is".

Consequently, the applicants who decided that FU-16 is the fuse that blew chose the approved answer, A.

If the applicant decides that FU-18 has blown, then we observe two things...

1. As already mentioned above, FU-18 supplies 120 VAC RPS Bus 11 power to the PWRS which in turn powers the valve position indicator POI-29-134.

PART 3

SUPPORT DOCUMENTATION

- Drawing C-23077-C, sheet 4
- ARP H3-4-6

PART 3 of this justification includes Alarm Response Procedure H3-4-6. The NOTE in this procedure describes the failure mode for Position Indicator POI-29-134; that is, the indicator "Fails Upscale" on a loss of power.

This response affirms the right-column portion of answer choice B.

2. Notice that the PWRS (at Terminal 8) supplies operating power to the Shaft Pump #13 Control Valve POT, as well. This POT device is essentially the E/P Converter which ultimately strokes the FCV 13 valve stem (i.e, the actual valve positioner).

   In other words, the effect of a blown fuse FU-18 is to interrupt the ability to control the position of FCV 13, again causing the VALVE to "Fail As Is".

   This response affirms the left-column portion of answer choice B.

Consequently, the applicants who decided that fuse FU-18 is the fuse that blew chose distractor B as the correct answer.

Conclusions:

Because the stem conditions did not specify which fuse was blown, an applicant could justify either of choice A, or B, as the correct answer.

RECOMMENDATION:

Accept two correct answers for question RO 059 / SRO 062. Those answers are: A and B.

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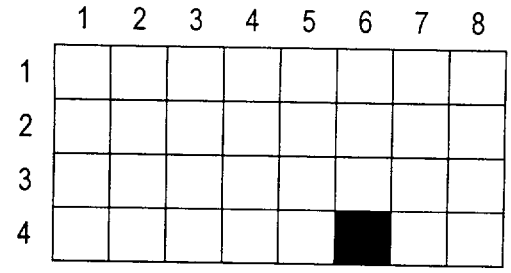
PANEL: H3 ANNUNCIATOR: 4-6



FEEDWATER
CONTROL SYSTEM
TROUBLE

Computer Printout:

A166 FW CNTL VLV SIG FAILURE_____FAIL

A167 FW CNTL VLV AIR SUP FAIL_____FAIL

W096 FW INST AC POWER TROUBLE_____YES
W098 HPCI SIGNAL FAILURE_____YES

Device – Setpoint:

ESE-29-162/ID83-B – 11 FWP
ESE-29-163/ID83-C – 12 FWP
ESE-29-164/ID83-A – 13 FWP
ESE-29-136 – 13 FWP
PS-29-31/63L – 11FWP_____75 PSIG
PS-29-32/63L – 12FWP_____75 PSIG
PS-29-33/63L – 13FWP_____75 PSIG
27A11/12, 27NX11/12
LSE–ID92

NOTE: #13 FCV Position indicator (POI-29-134) may Fail upscale due to loss of power to the positioner (POT-29-136). Actual valve position is unchanged as #13 FCV Fails as-is on loss of power.

Operator Actions:

1. Confirm alarm on computer printout.
2. IF FW Control Valve failure,
   THEN place FW FCV controller in Local Manual AND control RPV water level locally in accordance with N1-OP-16 Section G, Shaft Pump Shutdown.
3. WHEN signal/air restored to FCV, reset the lock up solenoid valves in accordance with N1-OP-16, Section H, Feedwater FCV Lockup.
4. IF Instrument AC Trouble,
   THEN determine if Normal or Alternate power was lost, WHEN restored, reset circuit on E-Console.
5. IF HPCI Signal Failure,
   THEN check alarm unit 1D92 on Cabinet 1S34 in the Auxiliary Control Room.

Possible Causes:

1. Loss of air to FW FCV
2. Loss of RPS
   - CH. 11 (Aux Cont Cab 1S34) Normal: RPS 11, CKT 12; Alternate: MG Set 167, CKT 19
   - CH. 12 (Aux Cont Cab 1S35) Normal: RPS 12, CKT 12; Alternate: MG Set 167, CKT 20
3. FW Master Controller output signal less than zero.

References:

1. N1-OP-16
2. P&ID: C-18005-C
3. Electrical: C-23077-C, Sh. 5 & 6; C-19951-C, Sh. 3; C-23146-C, Sh. 7
4. T.S. 3.1.8

Alarm Contact:

A166_____1F15
A167_____1G15
W096_____1I21
W098_____1K21

NMP1 License Class LC1-0101
NRC INITIAL WRITTEN EXAMINATION POST-EXAMINATION ANALYSIS

PART 1

Examination Outline Cross-reference:	Level	RO	
	Tier #	2	
	Group #	1	
	K/A #	223002	
	Importance Rating	3.6	

Proposed Question: **RO 054**

The plant is operating at 100% power with the following:

- Battery Board 11 is clearance tagged
- Transferrable loads have been transferred to Battery Board 12

Then, the following occurs:

- Loss of Powerboard 161B
- Failure to Scram
- Liquid Poison is initiated
- RPV water level has been intentionally lowered to -41 inches

Which one of the following describes the current status of the Reactor Water Cleanup System (RWCU) and Reactor Sample Return IVs (63-04 and 63-05)?

	RWCU	REACTOR SAMPLE RETURNS
A.	Isolated	Closed
B.	Isolated	Open
C.	Not isolated	Closed
D.	Not isolated	Open

Proposed Answer: **B**

Justification:	**B** is correct - Although loss of PB 161 B prevents closure of RWCU Inboard IV (33-02R), the Outboard IV is a DC valve powered from Battery Board 12. The RWCU Return IV (33-01R) still has power from PB 171B. When Liquid Poison is initiated, RWCU will successfully isolate. The Reactor Sample Return Ivs are DC valves powered from Battery Board 11 and are <u>not</u> transferrable loads. When an RPV Lo-Lo level occurs (+5 inches) for the failure to scram actions (lowering level), these valves will not auto-close. **A/C/D** are incorrect - for the reasons described above.

Proposed references to be provided to applicants during examination: None

Technical Reference(s):		N1-SOP-17, N1-OP-47A, O1-OPS-001-204-1-01	
K/A:	223002 Primary Containment Isolation/Nuclear Steam Supply Shutoff	A4.01, Ability to manually operate and/or monitor in the control room: Valve closures.	
10 CFR Part 55 Content:		55.41(7)	X
		55.43	
		55.45	

Question Source:	Bank #	
	Modified Bank #	
	New	X
	History	

Question Cognitive Level:	Memory or Fundamental Knowledge	
	Comprehension or Analysis	X
	LOD:	3

Comments: None

PART 2

JUSTIFICATION FOR CHANGE:

Analysis:

The question is flawed in that the correct answer and justification stated in the key, incorrectly identifies choice B as the correct answer. Specifically, for the right-column portion of the answer choices regarding the status of the Reactor Sample Return Isolation Valves 63-04 and 63-05, the resulting position is identified as "Open".

Each air-operated valve (63-04 and 63-05) is equipped with two DC solenoids per valve (reference drawing C-18009-C, sheet 1 coordinates G-1). One solenoid is powered from Battery Board (BB) 11 and the second solenoid is powered from BB 12 (reference drawing C-19859-C, sheet 11A coordinates B-2 and B-4). Energizing either solenoid allows air to be supplied to the actuator and the valve to be open. Drawing C-19859-C, sheet 11A identifies that the solenoids are "energized to open". De-energizing both solenoids will block and vent air from the actuator, closing the sample return isolation valve.

From the conditions stated in the question stem, BB 11 is de-energized resulting in one of the two solenoids being positioned to block and vent. Air is still supplied to the valve actuator through the 2nd solenoid energized from BB 12. When RPV water level is lowered below 5 inches to -41 inches, as stated in the question stem, Vessel Isolation Channel 12 Logic will actuate to de-energize the remaining solenoid. Air will be vented from the actuator resulting in 63-04 and 63-05 valve closure.

Conclusion:

Based on the above description of valve operation, the correct answer is choice A, not choice B.

Recommendation:

Change answer key to reflect choice A as the only correct answer.

OPERATIONS BRANCH CONCURRENCE: _____ (Signature) 10/17/02 (Date)

OPERATIONS TRAINING SUPERVISION: _____ (Signature) 10/17/02 (Date)

PART 3

SUPPORT DOCUMENTATION

- Drawing C-18009-C, Sheet 1
- Drawing C-19859-C, Sheets 10 and 11A