

NINE MILE POINT NUCLEAR STATION / P.O. BOX 32 LYCOMING, NEW YORK 13093 / TELEPHONE (315) 343-2110

April 21, 1989

Mr. William Russell  
Regional Administrator  
ATTN: Mr. Robert M. Gallo  
Branch Chief  
United States Nuclear Regulatory Commission  
Region I  
475 Allendale Road  
King of Prussia, PA 19406

Dear Mr. Russell:

This letter concerns the NRC Hot License written examinations administered to eight (8) Nine Mile Point Unit #2 Reactor Operator candidates and six (6) Nine Mile Point Unit #2 Senior Reactor Operator candidates on April 18, 1989. Mr. Carl Sisco of Region I was lead examiner and was assisted by Ms. Tracy Walker and Mr. Allen Howe.

We felt that this exam was well written and that in most cases the questions and answer key accurately reflected the training material and plant procedures cited as references. Please see the enclosed attachments for our exam comments. Attachment 1 contains the RO exam comments, Attachment 2 contains the SRO exam comments and Attachment 3 contains supporting documentation.

We appreciate the efforts of Mr. Sisco, Ms. Walker and Mr. Howe for ensuring that this examination was conducted in a very professional manner.

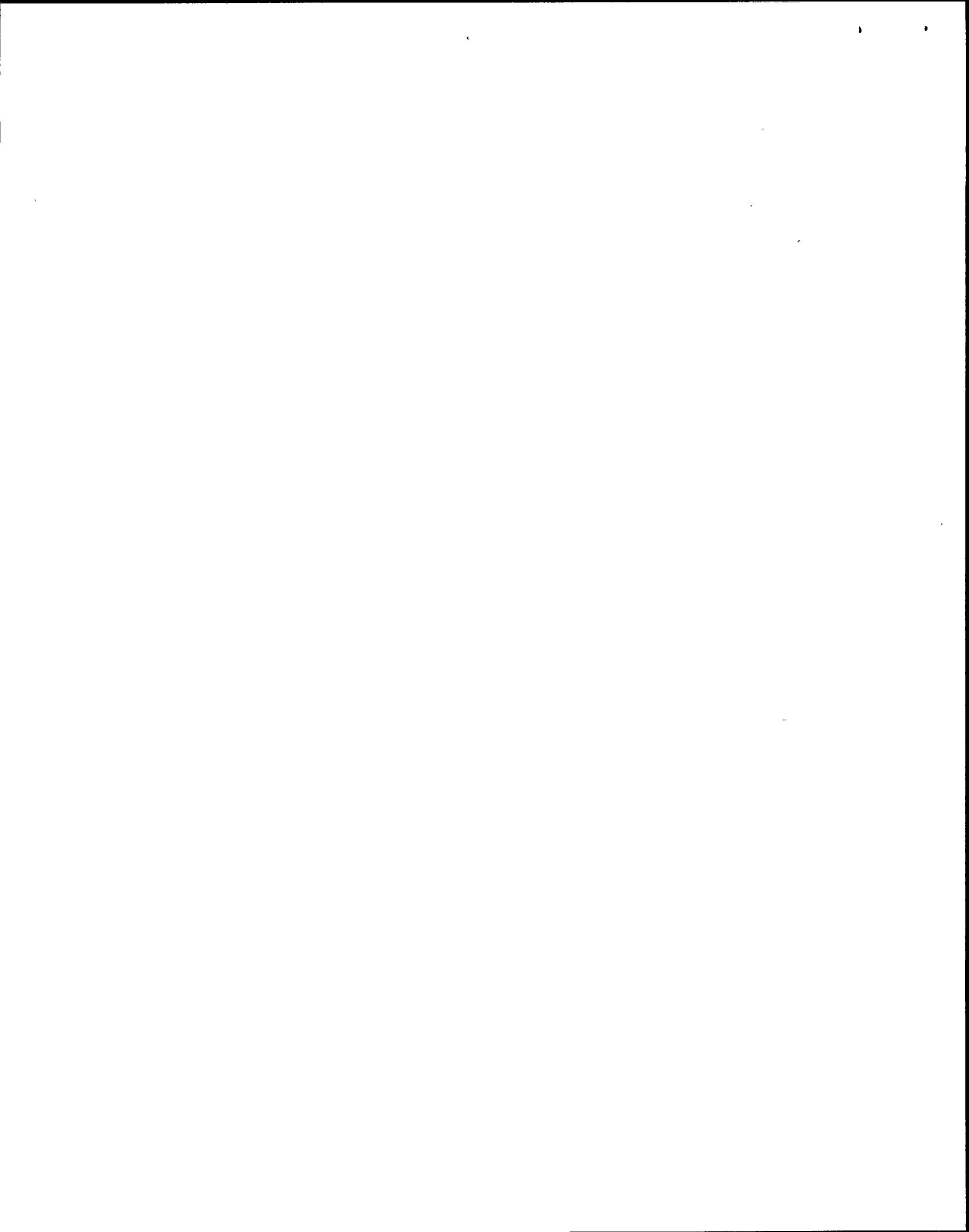
Please feel free to contact me if you need additional information.

Very truly yours,

  
James L. Willis  
General Superintendent  
Nuclear Generation

JLW/GW/dmj

Attachments (3)



EXAM COMMENT 1 -

A. QUESTION: 1.06 (2.00)

Concerning core orificing:

- a. STATE the reason for orificing the entrance to each fuel assembly? (1.0)
- b. The reactor is operating at 100% power and flow. SELECT the ONE (1) correct response which describes the response of channel flow when the control rod adjacent to that channel is partially inserted. Assume flow control valve position remains constant.(1.0)
  - (1.) Channel flow decreases due to reduced steam demand
  - (2.) Channel flow increases due to a decrease in two phase flow resistance
  - (3.) Channel flow decreases due to increase in hydraulic resistance of control rod
  - (4.) Channel flow increases due to increased subcooling

ANSWER:

1.06 (2.00)

- a. Central bundles produce more power and, due to higher steam generation, have a higher two phase pressure drop [+0.5]. Orificing provides a means of balancing the assembly flow with the power it produces preventing a localized overheating situation [+0.5] (flow distribution to hottest bundles)
- b. (2.) [+1.0]

REFERENCE:

1. NMP2: GE BWR Academic Series, "Heat Transfer and Fluid Flow," pp. 8-45, 8-46, and 8-47.
2. NMP2: N2-OLP-BTH, L.O. 9.3 and 8.5

293008K131 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

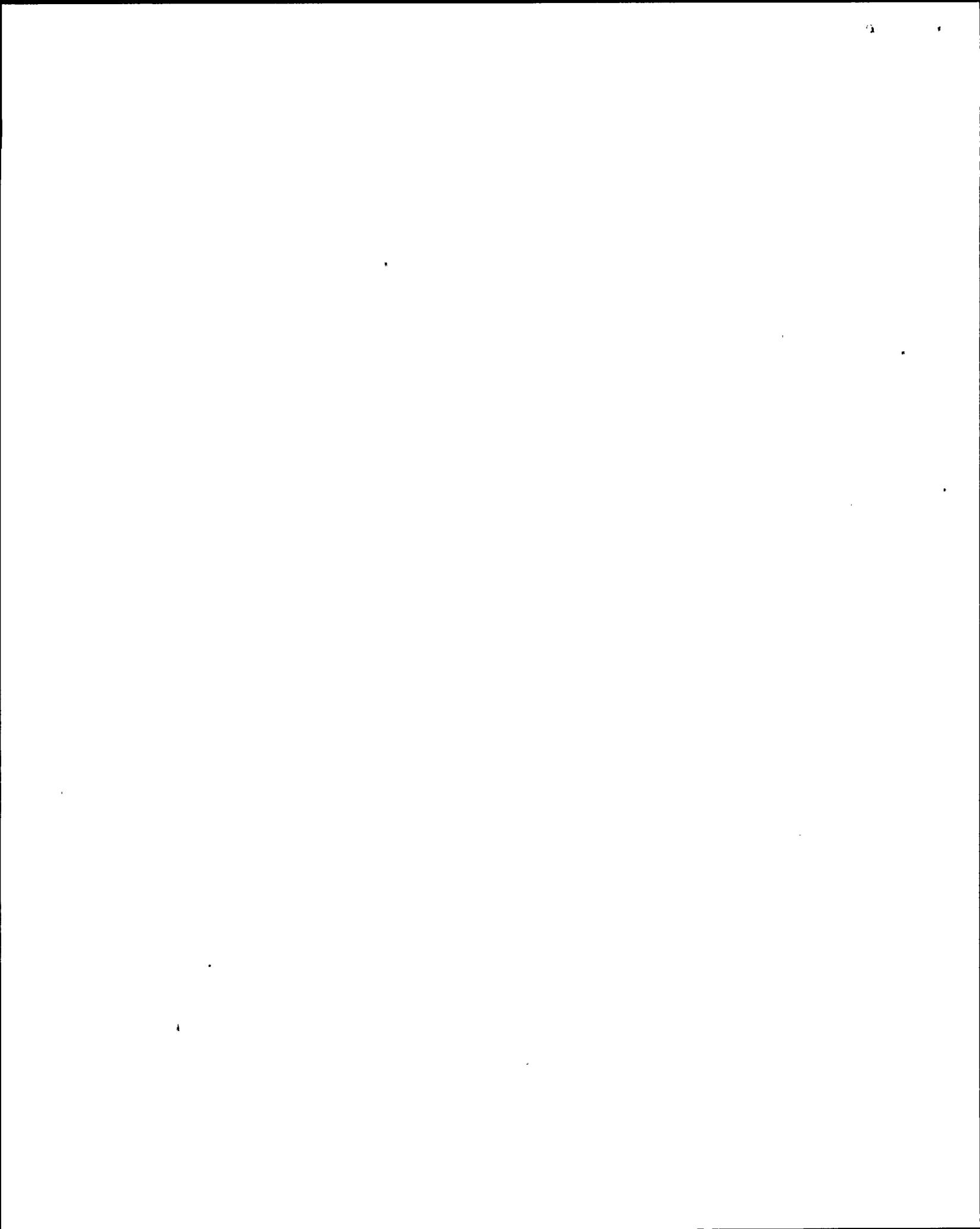
An alternative acceptable answer to part a. could be:

The core is orificed to stabilize core flow over a wide power range. By providing a constant, dominant pressure drop, individual bundle flow changes will be small as boiling (and hence flow resistance) increases.

C. REFERENCE:

1. NMP2: GE BWR Academic Series, "Heat Transfer and Fluid Flow", pg. 8-59

RO Exam Comments -1 April 1989



EXAM COMMENT 2

A. QUESTION: 1.11 (1.50)

STATE THREE (3) conditions that must be met prior to racking in a 4160V breaker.

(1.5)

ANSWER: 1.11 (1.50)

1. Breaker control switch in "Pull to Lock" position. [+0.5]
2. Control circuit fuses removed. [+0.5]
3. Breaker in open position. [+0.5]

REFERENCE:

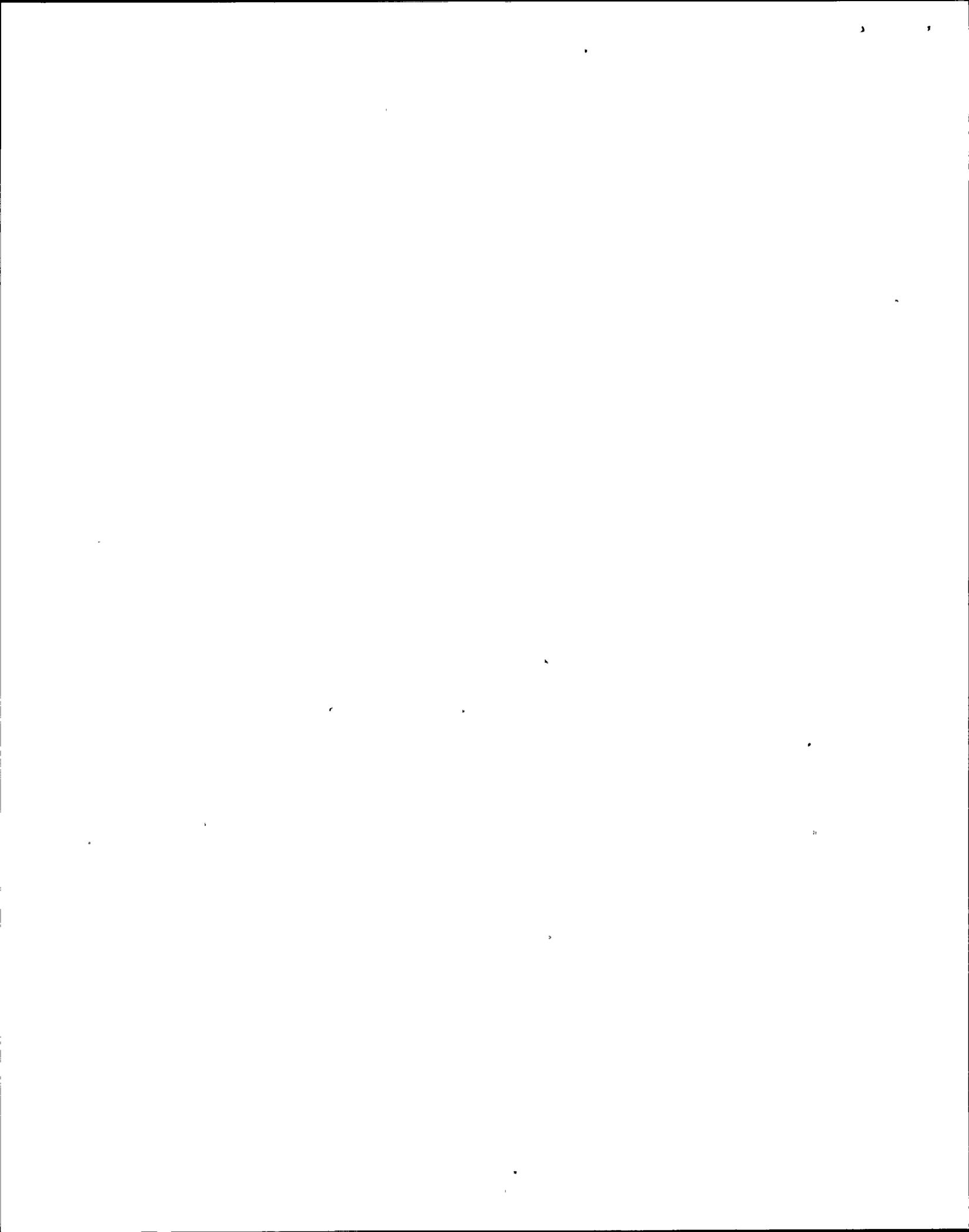
1. NMP2: OP-71, pg. 3  
291008K107 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

The answer for this question does not address any electrical safety concerns. Recommend that any answer stating electrical safety concerns should be accepted.

C. REFERENCES:

See attached sheets for examples.



EXAM COMMENT 3

A. QUESTION: 1.16 (3.00)

STATE whether EACH of the following changes would INCREASE, DECREASE, or HAVE NO EFFECT on the heat transfer rate in the Reactor Building Closed Loop Cooling Water (RBCLCW) heat exchangers. JUSTIFY your answer. ASSUME all other parameters are held constant and STATE any additional assumptions.

- a. tube failure (rupture) (1.0)
- b. an increase in Service Water System Flow (1.0)
- c. a decrease in Service Water Temperature (1.0)

ANSWER: 1.16 (3.00)

- a. Decrease [+0.25]. High temperature/pressure fluid will mix with low pressure/temperature fluid, lowering the temperature difference between the cooling medium and the cooled medium [+0.75]. -OR- reduced mass flow of the high pressure fluid.
- b. Increase [+0.25]. An increase in the mass flow rate of the cooling fluid increases the temperature difference resulting in an increase in heat transfer rate [+0.75].
- c. Increase [+0.25]. A decrease in the temperature of the cooling fluid causes an increase in  $\Delta T$  (which increases the heat transfer rate) [+0.75].

REFERENCE:

- 1. NMP2: GE Academic Series, "Heat Transfer and Fluid Flow," pp. 7-27 through 7-39.
- 2. NMP2: N2-OLP-HXF, L.O. 4.6  
291006K108 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

- 1. In answer (a.), the High Temperature Fluid (RBCLCW) is the low pressure fluid and the low temperature fluid is the high pressure fluid (Service Water).
- 2. For part (b.), another acceptable answer may be no change in heat transfer. This is based on a stated assumption that the Service Water System Flow increase will not change The Service Water Flow through the Reactor Building Closed Loop Cooling Water Heat Exchangers. The flow will remain fairly constant due to the throttle valves in the Service Water System for the Heat Exchangers. When a service water pump is added, it is in parallel with the other pumps and this will not cause a change in system pressure. Therefore having a constant pressure in the system and a constant throttle valve position the flow through the heat exchanger will not change.

C. REFERENCES:

G.E. Heat Transfer and Fluid Flow, Chapter 6

P&ID 11

Attached system data point printout

RO Exam Comments -3 April 1989



EXAM COMMENT 4

A. QUESTION: 2.04 (1.50)

During an accident condition, the SRM's can be used to make a crude determination of reactor water level. DESCRIBE the method of determining reactor water level using SRM's. (1.5)

ANSWER: 2.04 (1.50)

Withdraw detectors and observe countrate. [+0.5] When detector reaches water level, countrate increases significantly (due to moderation). [+0.5] Knowing withdrawal speed and time for countrate increase, water level can be determined. [+0.5]

REFERENCE:

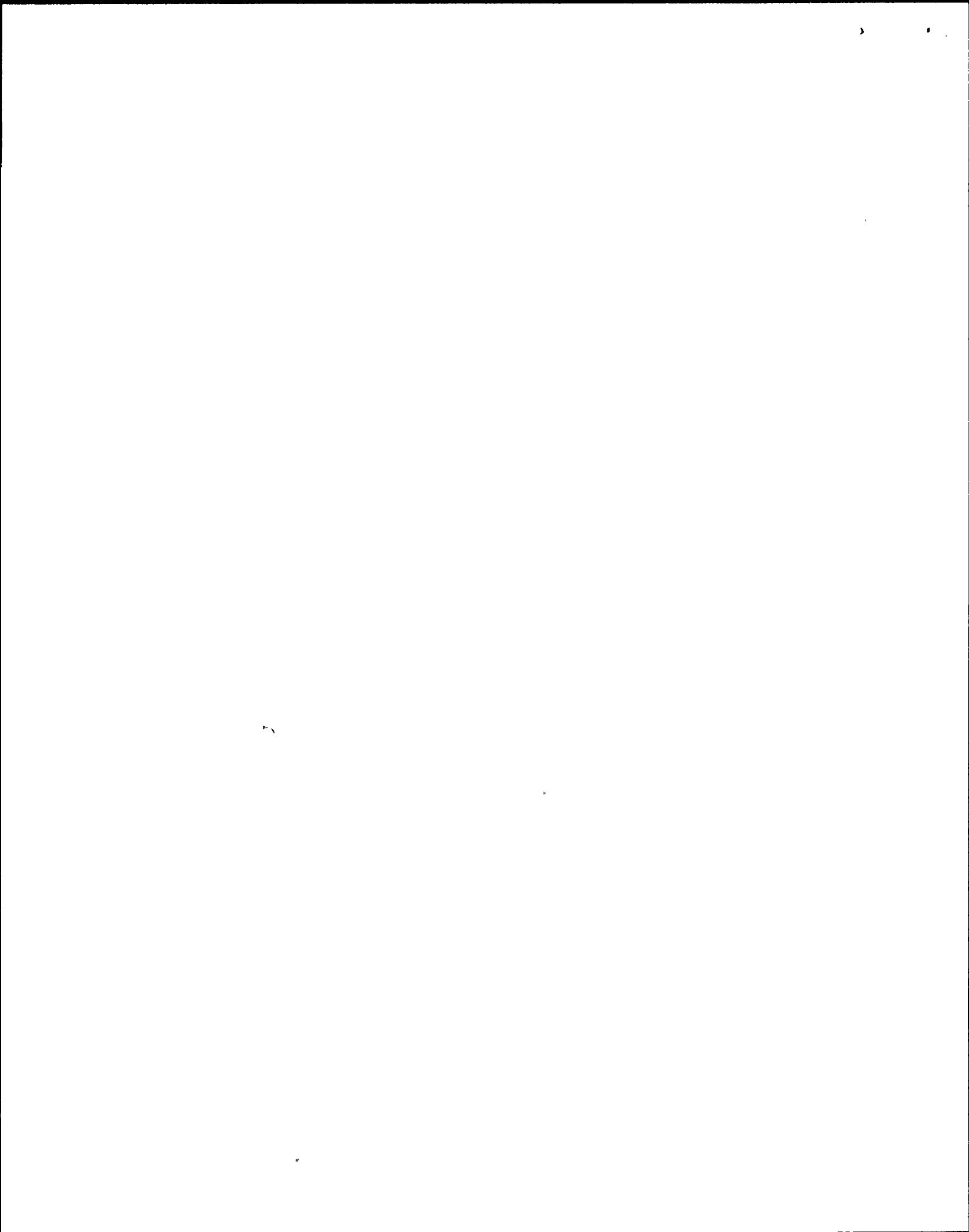
1. NMP2: N2-MOCD, pp. 7-7, and 7-8
2. NMP2: N2-MOCD-LP-LO, EO-5  
295031A201 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

Answer identified that countrate would "increase significantly," MOCD Text, page 7-11, SRM, identifies that the SRM output "should change" depending on the pulse height setting. Full credit should be given, if stated, the SRM countrate should "change" since it could increase or decrease depending on conditions.

C. REFERENCE:

MOCD, pp. 7-11



EXAM COMMENT 5

A. QUESTION: 2.13 (1.50)

Adequate core cooling exists if one or more of three conditions exists.  
WHAT are the THREE (3) conditions. (1.5)

ANSWER: 2.13 (1.50)

- a. the active fuel is covered with liquid or a two-phase mixture [+0.5]
- b. all heat generated is removed by core spray [+0.5]
- c. all heat generated is removed by a cooling flow of steam [+0.5]

REFERENCE:

- 1. NMP2: N2-MOCD-LP, p. 5-1  
295021K103 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

Answer for this question describes the three conditions. Stating "Core Submergence, Spray Cooling, and Steam Cooling" or giving a description of the conditions, should be considered for full credit.

C. REFERENCE:

NMP2: N2-MOCD-LP, p. 5-1



EXAM COMMENT 6

A. QUESTION: 3.03 (3.00)

With the plant operating at 100% power, WHAT are six (6) control room indications that one or more Safety Relief Valves are stuck open? (3.0)

ANSWER: 3.03 (3.00)

1. reduction of electrical output
2. steam/feedflow mismatch
3. vessel level increases then decreases to stabilize at slightly lower than previous operating level
4. suppression pool temperature increase
5. valve indication lights
6. acoustic monitors
7. pipe discharge temperature increase

Any six (6) [+0.5] each, +3.0 maximum.

REFERENCE:

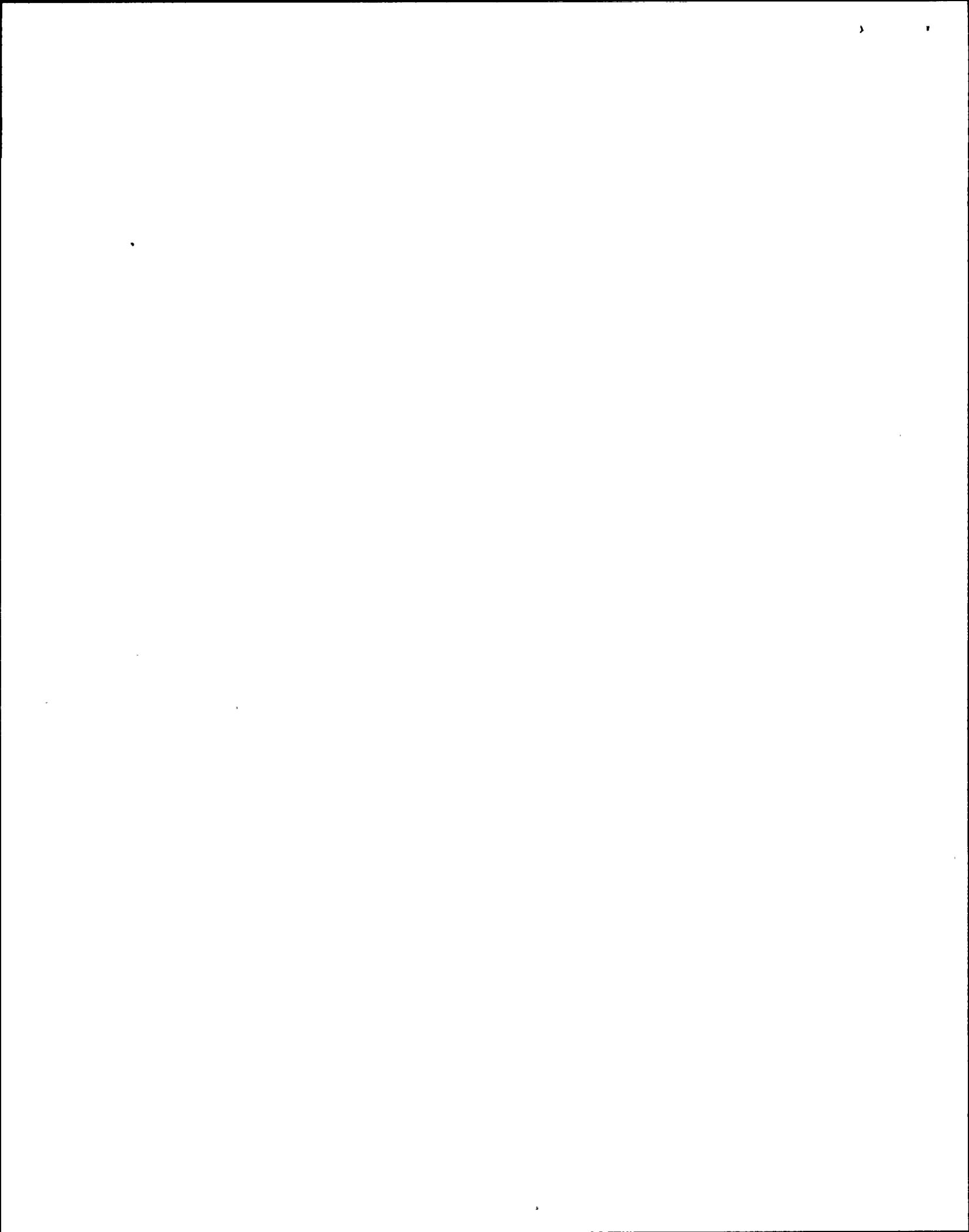
1. NMP2: N2-OP-34, p. 9  
239002A203 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

Another possible answer for part b. should be, per N2-OP-34, Annunciator (601 548, Safety/Relief Valve Open) on Panel 601.

C. REFERENCE:

NMP2: N2-OP-34, pps. 9 and 67



EXAM COMMENT 7

A. QUESTION: 3.07 (2.00)

Concerning standby liquid control (SLS):

- a. WHAT are SIX (6) control room indications that can be used to verify that SLS was performing its design function. (1.5)
- b. If the SLS pumps become inoperative, WHAT is the alternate method of injecting sodium pentaborate? (0.5)

ANSWER: 3.07 (2.00)

- a.
  1. SLS pump running lights
  2. RWCU isolation
  3. SLS storage tank level decreasing
  4. Reactor power decreasing
  5. SLS system flow indication
  6. SLS system pressure indication
  7. Squib valve lights extinguished

Any six [+0.25] each

- b. hydrostatic pump [+0.5]

REFERENCE:

1. NMP2: N2-OP-34, LO 10
2. NMP2: N2-OP-36A  
211000K301 2111000A201 211000A106 ..(KA's)

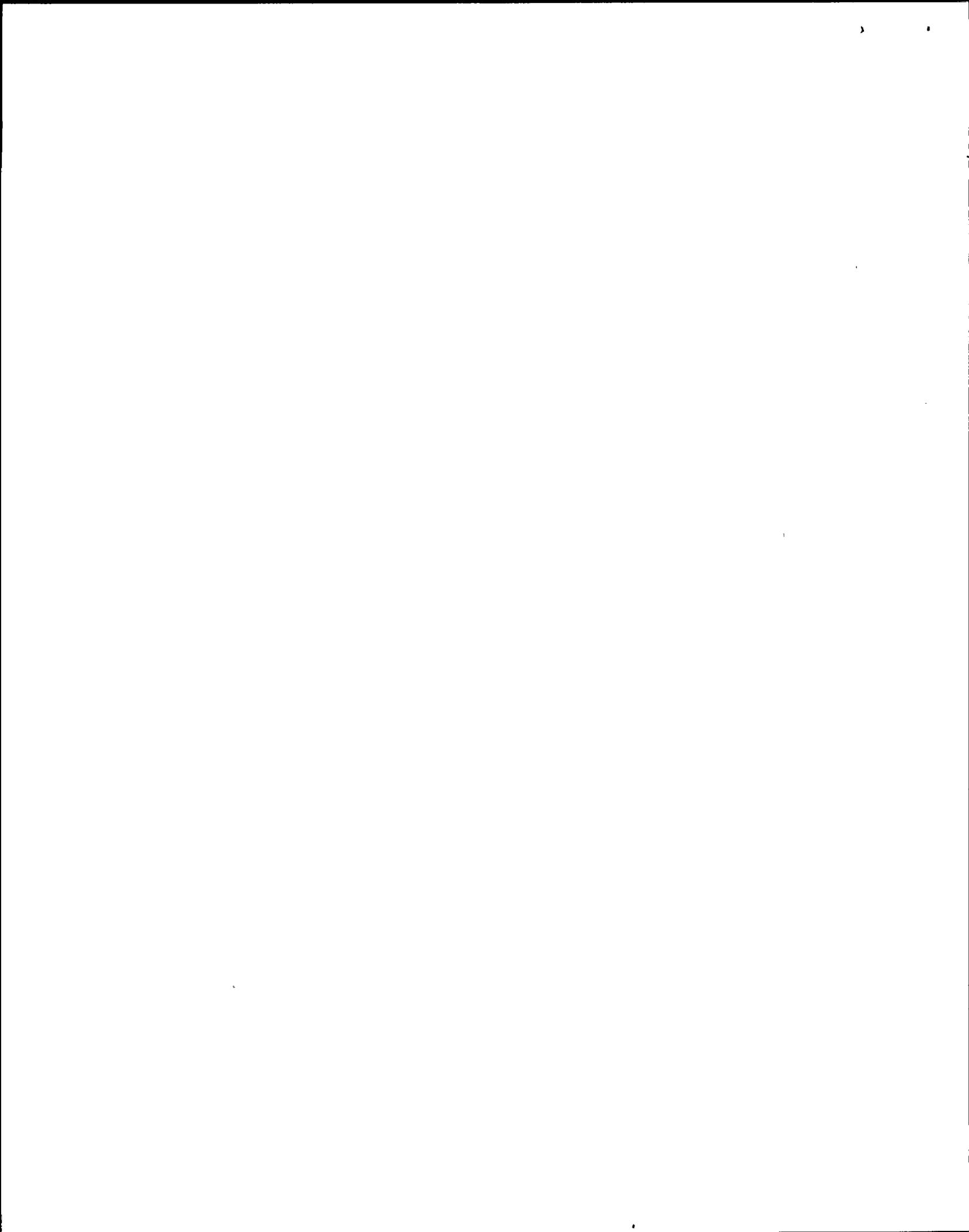
B. FACILITY COMMENT/RECOMMENDATION

The following list are possible additions to the answer for part a., per N2-OP-36A;

1. SLC Storage Tank Outlet Valves (Pump Suction Valves)  
SLS\*MOV1A and MOV1B open
2. SLS pump running can also be indicated by pump ammeters on P601

C. REFERENCE:

1. NMP2: N2-OP-36A, "Standby Liquid Control System"
2. NMP2 P&ID 36



EXAM COMMENT 8

A. QUESTION: 3.14 (2.00)

- a. STATE the bases for hydrogen concentration in the offgas train as specified by Technical Specifications of 4%. (0.5)
- b. STATE TWO (2) methods the offgas system uses to maintain the hydrogen concentration below the Technical Specification limit. (1.0)
- c. WHAT specific precaution, according to Procedure N2-OP-42, must be observed when operating the offgas system with hydrogen concentration above the specified limit? (0.5)

ANSWER: 3.14 (2.00)

- a. Maintain hydrogen concentration below the flammability limit. [+0.5]
- b.
  1. reduction via recombiners [+0.5]
  2. dilution via service air [+0.5]
- c. Do not operate any offgas isolation valve [+0.5] (due to potential for hydrogen explosion).

REFERENCE:

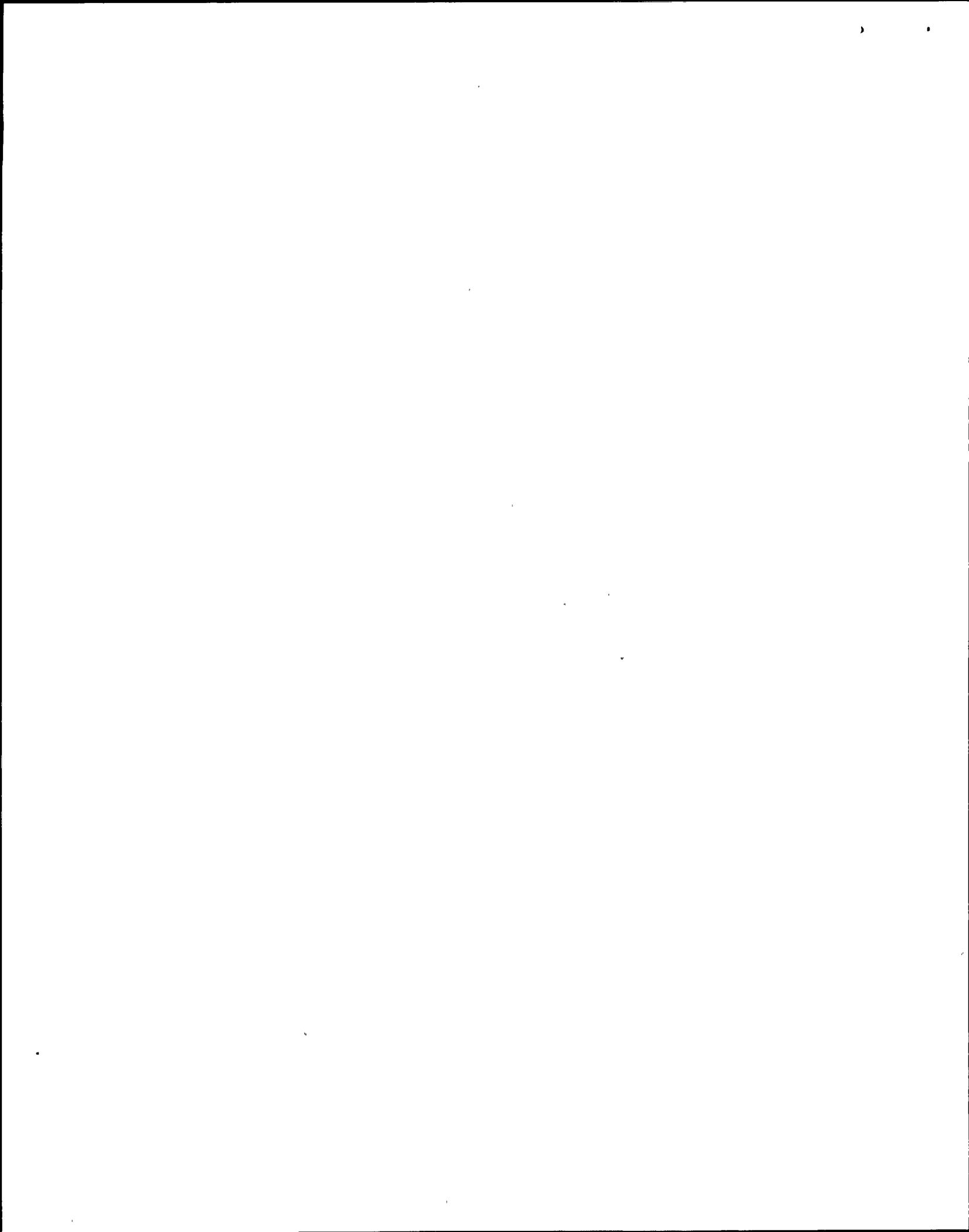
1. NMP2: OLP-52, Objectives 5 and 9
2. NMP2: N2-OP-42, Precaution 8.0, p. 3  
271000K401 271000G010 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

An additional acceptable answer for part b. could be sufficient auxiliary steam flow through the second stage air ejector to maintain the discharge hydrogen concentration less than 4%, per N2-OLT-52.

C. REFERENCE:

1. N2-OLT-52, Condenser Air Removal and Offgas System, Rev. 4



EXAM COMMENT 9

A. QUESTION: 3.15 (2.50)

- a. WHAT are THREE (3) signals that will initiate an isolation of Reactor Building Ventilation. Setpoints are not required. (1.5)
- b. STATE the automatic actions that occur in the Reactor Building Ventilation System upon receipt of an isolation signal. (1.0)

ANSWER: 3.15 (2.50)

- a. 1. LOCA signal (high drywell pressure or level 1)  
2. Reactor building high radiation level  
3. low air flow in exhaust ducts

[+0.5] each

- b. 1. isolation dampers shut  
2. supply and exhaust fans stop  
3. Reactor Building emergency recirculation subsystem starts  
4. standby gas treatment system starts

[+0.25] each

REFERENCE:

1. NMP2: N2-OLP-71, LOs 5c, 5d, and 5e
2. NMP2: N2-OLT-71, pp. 9 and 10
3. NMP2: N2-OLP-71, p. 21  
288000K401 288000K402 ..(KA's)

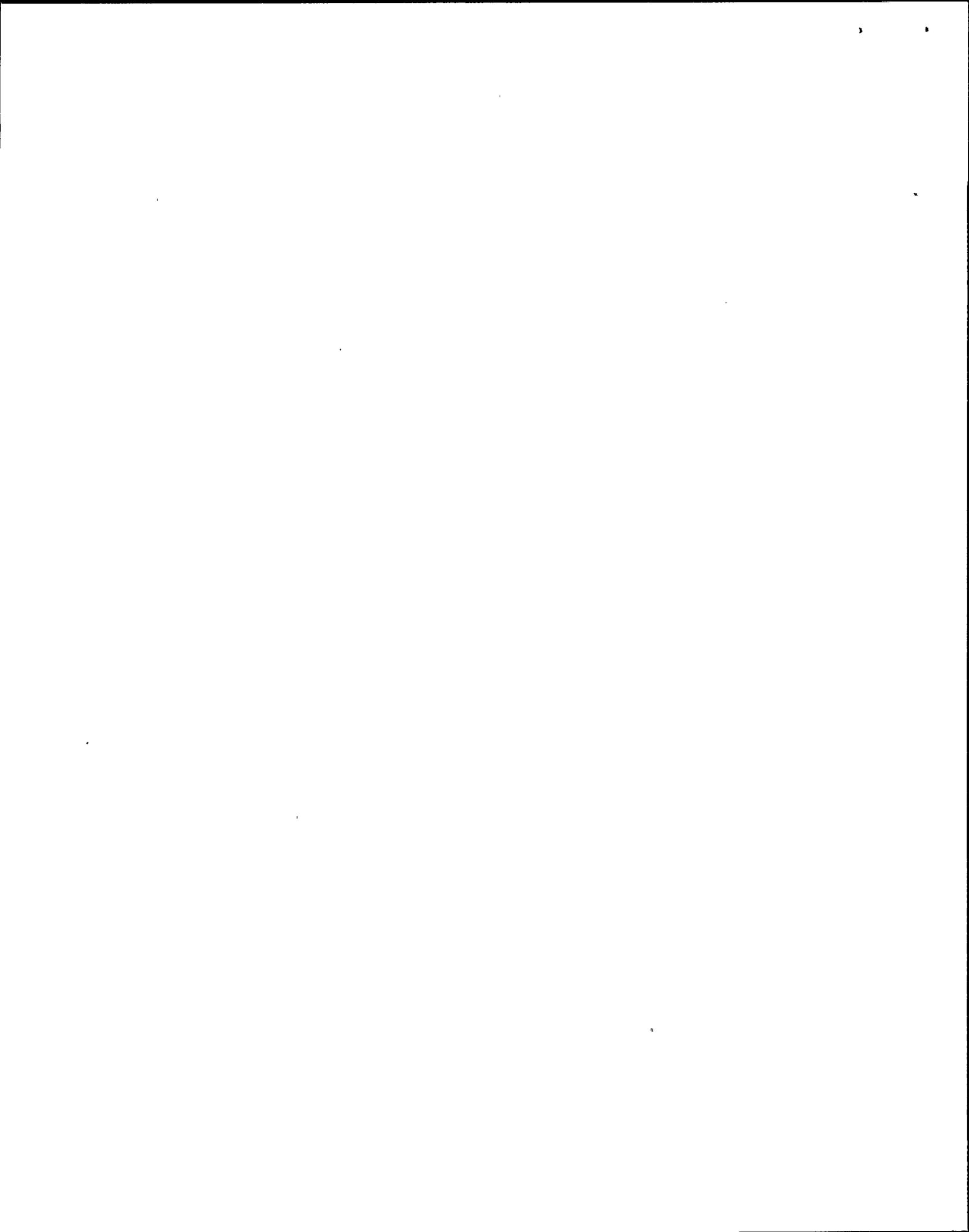
B. FACILITY COMMENT/RECOMMENDATION

Part a.1. Per discussion in pre-exam review the HVR isolation signal should be Level 2 not Level 1 as stated in answer key. SRO Exam key was changed by examiner to reflect this (6.03).

Part b.4. Should not be required for full credit because the GTS System is not part of the Reactor Building Ventilation System. This comment was brought up during pre-exam review as a possible problem with candidates.

C. REFERENCE:

N2-OP-52,  
N2-OP-61B



EXAM COMMENT 10

A. QUESTION: 3.22 (1.00)

With regard to the Reactor Recirculation Flow Control System, WHICH ONE (1) of the following conditions will NOT cause the Loop Flow Controllers to transfer from automatic to manual. (1.0)

- (a.) High Drywell Pressure (1.68 psig)
- (b.) Flow Control Valve runback
- (c.) excessive rate of change in the Flux Controller output
- (d.) loss of tracking signal

ANSWER: 3.22 (1.00)

(b.) [+1.0]

REFERENCE:

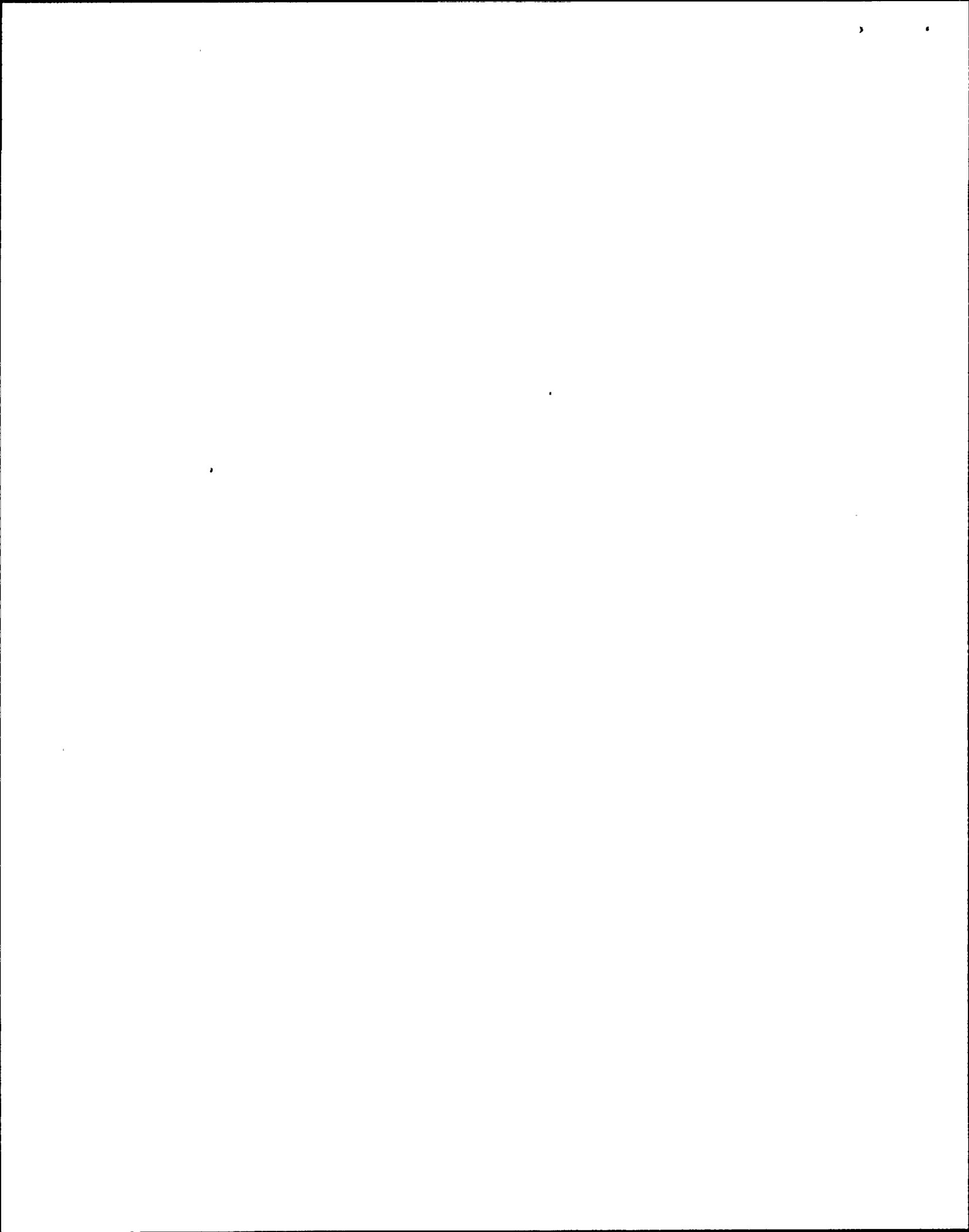
1. NMP2: N2-OLT-9, p. 10  
202002K403 202002G007 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

No correct response is provided for this question. Per the reference, all selections will cause the shift. Reference identifies "A loss of feed pump with concurrent vessel water low level alarm" (Level 4-159.3"), this is a Flow Control Valve Runback which is answer "b".

C. REFERENCE:

N2-OLT-9, p. 10



EXAM COMMENT 11

A. QUESTION: 3.24 (1.50)

LIST the individuals (by title) who have the responsibility and authority to shutdown the reactor when the reactor is in immediate jeopardy or when reactor protection system setpoints have been exceeded and automatic shutdown does not occur. (1.5)

ANSWER: 3.24 (1.50)

1. SRO in charge of the Control Room [+0.5]
2. Chief Shift Operator (CSO) [+0.5]
3. Nuclear Auxiliary Operator "E" acting as CSO [+0.5]

REFERENCE:

1. NMP2: AP-4.0, p. 3
2. NMP2: N2-OLP-APH EO-3  
294001A109 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

Answer part 1. Stating the Station Shift Supervisor (SSS) as the SRO in charge of the Control Room should be considered for full credit as he normally assumes this duty.

C. REFERENCE:

AP-4.0, p.3



EXAM COMMENT 12

A. QUESTION: 3.25 (2.00)

Concerning the Safety Parameter Display System (SPDS):

- a. WHAT is the significance of a white numeric field followed by a yellow "Q"? (0.5)
- b. WHAT is the significance of a blank field followed by "N"? (0.5)
- c. WHICH safety function block(s) is/are placed in an alarm condition upon high drywell pressure? (1.0)

ANSWER: 3.25 (2.00)

- a. Value of parameter in doubt. (Requires validation). [+0.5]
- b. Value of parameter is unknown. [+0.5]
- c. Coolant System integrity [+0.5]  
Containment integrity [+0.5]

REFERENCE:

- 1. NMP2: N2-OLP-37, LOs 4, 5, 6, and 7
- 2. NMP2: N2-OLP, pp. 7, 8, and 9  
294001A115 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

The SPDS text identifies the white "N" indicates value unknown or "failed" indicating no value. No inputs should be considered for full credit as it describes failed inputs.

C. REFERENCE:

N2-OLT-37, pp. 5

3

EXAM COMMENT 13

A. QUESTION: 3.27 (1.50)

Assuming regulatory exposure limits will not be exceeded and a NRC Form-4 is on file, WHAT are the current guidelines used by the Niagara Mohawk Power corporation for occupational Whole Body Dose per:

- a. week (0.5)
- b. quarter (0.5)
- c. year (0.5)

ANSWER: 3.27 (1.50)

- a. 100 mrem [+0.5]
- b. 1000 mrem (1 rem) [+0.5]
- c. 4000 mrem (4 rem) [+0.5]

REFERENCE:

- 1. NMP2: S-RP-1, p. 19  
294001K103 ..(KA's)

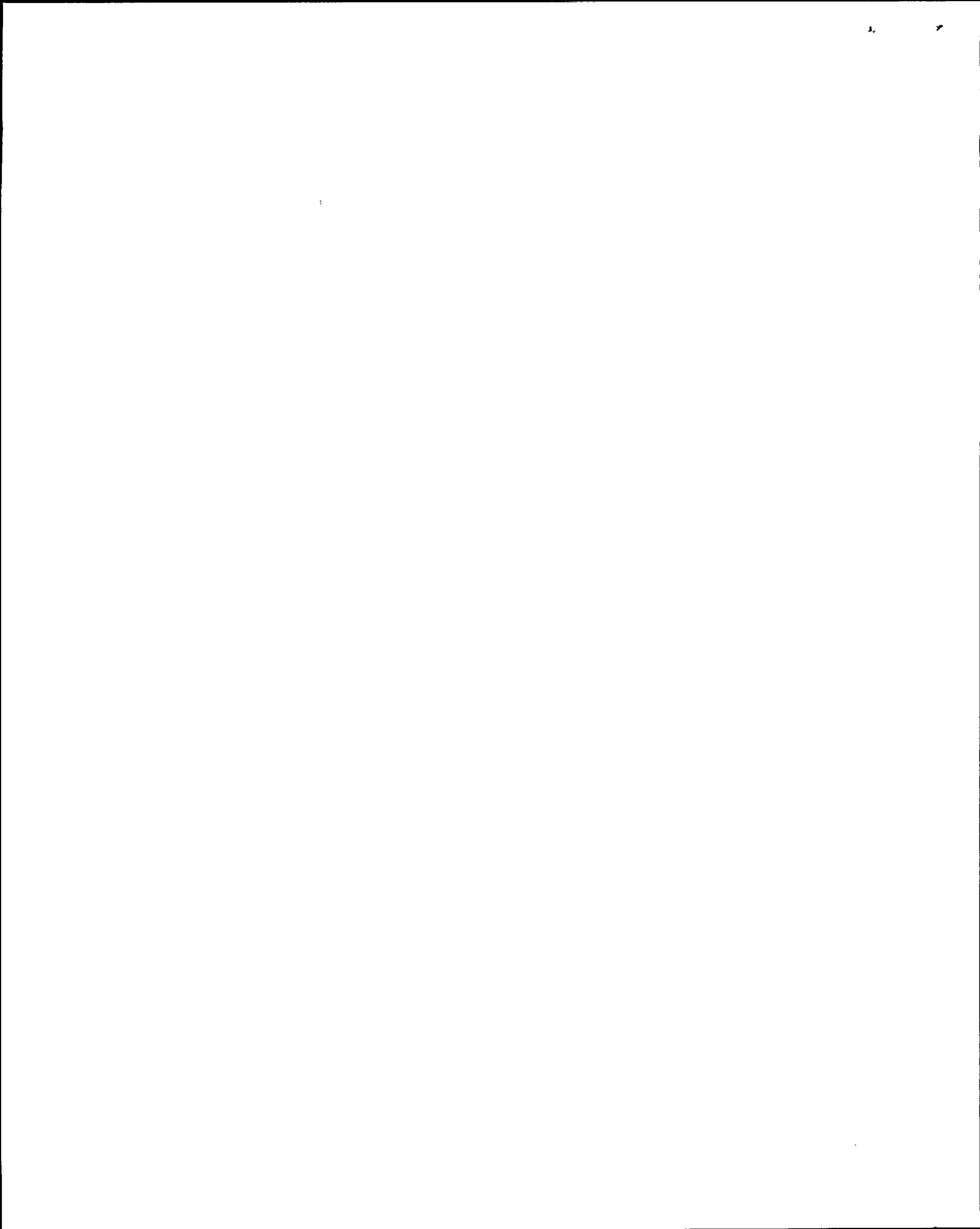
B. FACILITY COMMENT/RECOMMENDATION

Another acceptable answer could be zero (0) for part a.

This is based on the Site Radiation Protection Manual which was issued on November 15, 1988. The Training Department utilized S-RP-1, Access and Radiological Control, during the license class. Some students were aware of the fact that the RP Manual no longer includes the 100 mrem/week requirement.

C. REFERENCE:

NMPNS Radiation Protection Manual, 11/15/88



EXAM COMMENT 1

A. QUESTION: 4.06 (2.00)

Concerning core orificing:

- a. STATE the reason for orificing the entrance to each fuel assembly?  
(1.0)
- b. The reactor is operating at 100% power and flow. SELECT the ONE (1) correct response which describes the response of channel flow when the control rod adjacent to that channel is partially inserted. Assume flow control valve position remains constant.(1.0)
- (1.) Channel flow decreases due to reduced steam demand
  - (2.) Channel flow increases due to a decrease in two phase flow resistance
  - (3.) Channel flow decreases due to increase in hydraulic resistance of control rod
  - (4.) Channel flow increases due to increased subcooling

ANSWER:

1.06 (2.00)

- a. Central bundles produce more power and, due to higher steam generation, have a higher two phase pressure drop [+0.5]. Orificing provides a means of balancing the assembly flow with the power it produces preventing a localized overheating situation [+0.5] (flow distribution to hottest bundles)
- b. (2.) [+1.0]

REFERENCE:

- 1. NMP2: GE BWR Academic Series, "Heat Transfer and Fluid Flow," pp. 8-45, 8-46, and 8-47.
- 2. NMP2: N2-OLP-BTH, L.O. 9.3 and 8.5

293008K131 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

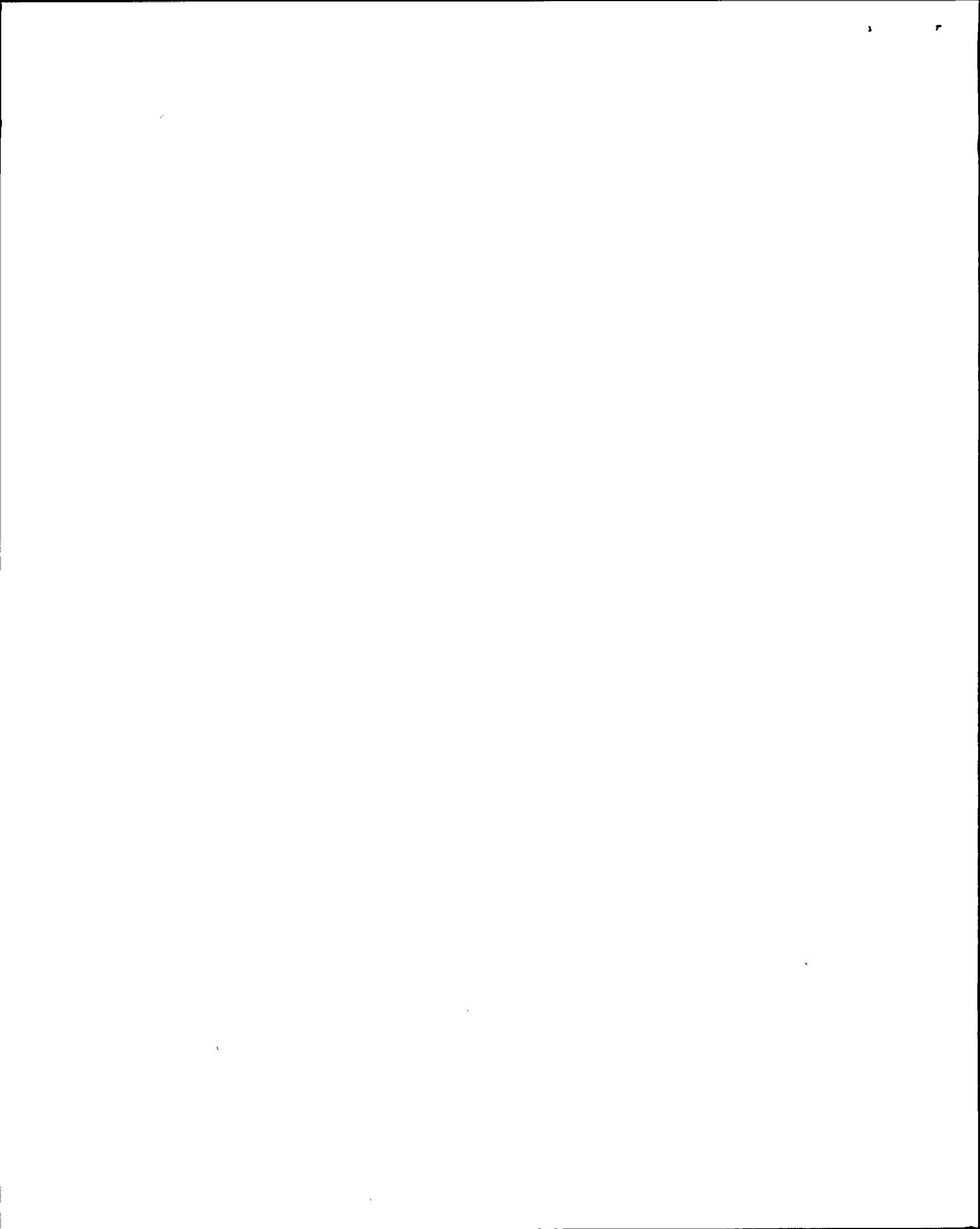
An alternative acceptable answer to part a. could be:

The core is orificed to stabilize core flow over a wide power range. By providing a constant, dominant pressure drop, individual bundle flow changes will be small as boiling (and hence flow resistance) increases.

C. REFERENCE:

- 1. NMP2: GE BWR Academic Series, "Heat Transfer and Fluid Flow", pg. 8-59

SRO Exam Comments -1 April 1989



EXAM COMMENT 2

A. QUESTION: 4.10 (1.50)

STATE THREE (3) conditions that must be met prior to racking in a 4160V breaker.

(1.5)

ANSWER: 4.10 (1.50)

1. Breaker control switch in "Pull to Lock" position. [+0.5]
2. Control circuit fuses removed. [+0.5]
3. Breaker in open position. [+0.5]

REFERENCE:

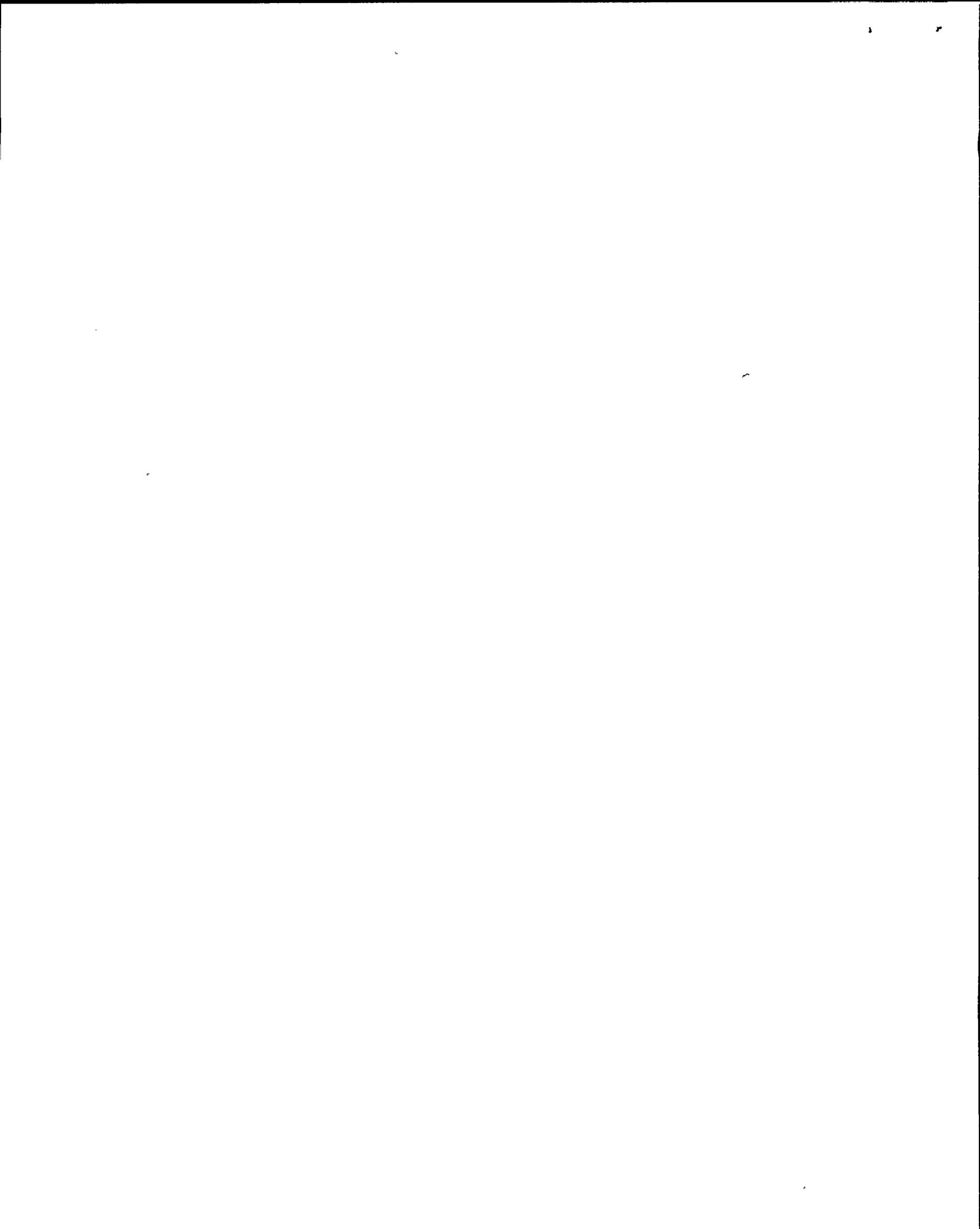
1. NMP2: OP-71, pg. 3  
291008K107 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

The answer for this question does not address any electrical safety concerns. Recommend that any answer stating electrical safety concerns should be accepted.

C. REFERENCES:

See attached sheets for examples.



EXAM COMMENT 3

A. QUESTION: 4.15 (3.00)

STATE whether EACH of the following changes would INCREASE, DECREASE, or HAVE NO EFFECT on the heat transfer rate in the Reactor Building Closed Loop Cooling Water (RBCLCW) heat exchangers. JUSTIFY your answer. ASSUME all other parameters are held constant and STATE any additional assumptions.

- a. tube failure (rupture) (1.0)
- b. an increase in Service Water System Flow (1.0)
- c. a decrease in Service Water Temperature (1.0)

ANSWER: 4.15 (3.00)

- a. Decrease [+0.25]. High temperature/pressure fluid will mix with low pressure/temperature fluid, lowering the temperature difference between the cooling medium and the cooled medium [+0.75]. -OR- reduced mass flow of the high pressure fluid.
- b. Increase [+0.25]. An increase in the mass flow rate of the cooling fluid increases the temperature difference resulting in an increase in heat transfer rate [+0.75].
- c. Increase [+0.25]. A decrease in the temperature of the cooling fluid causes an increase in  $\Delta T$  (which increases the heat transfer rate) [+0.75].

REFERENCE:

- 1. NMP2: GE Academic Series, "Heat Transfer and Fluid Flow," pp. 7-27 through 7-39.
- 2. NMP2: N2-OLP-HXF, L.O. 4.6  
291006K108 ..(KA's)

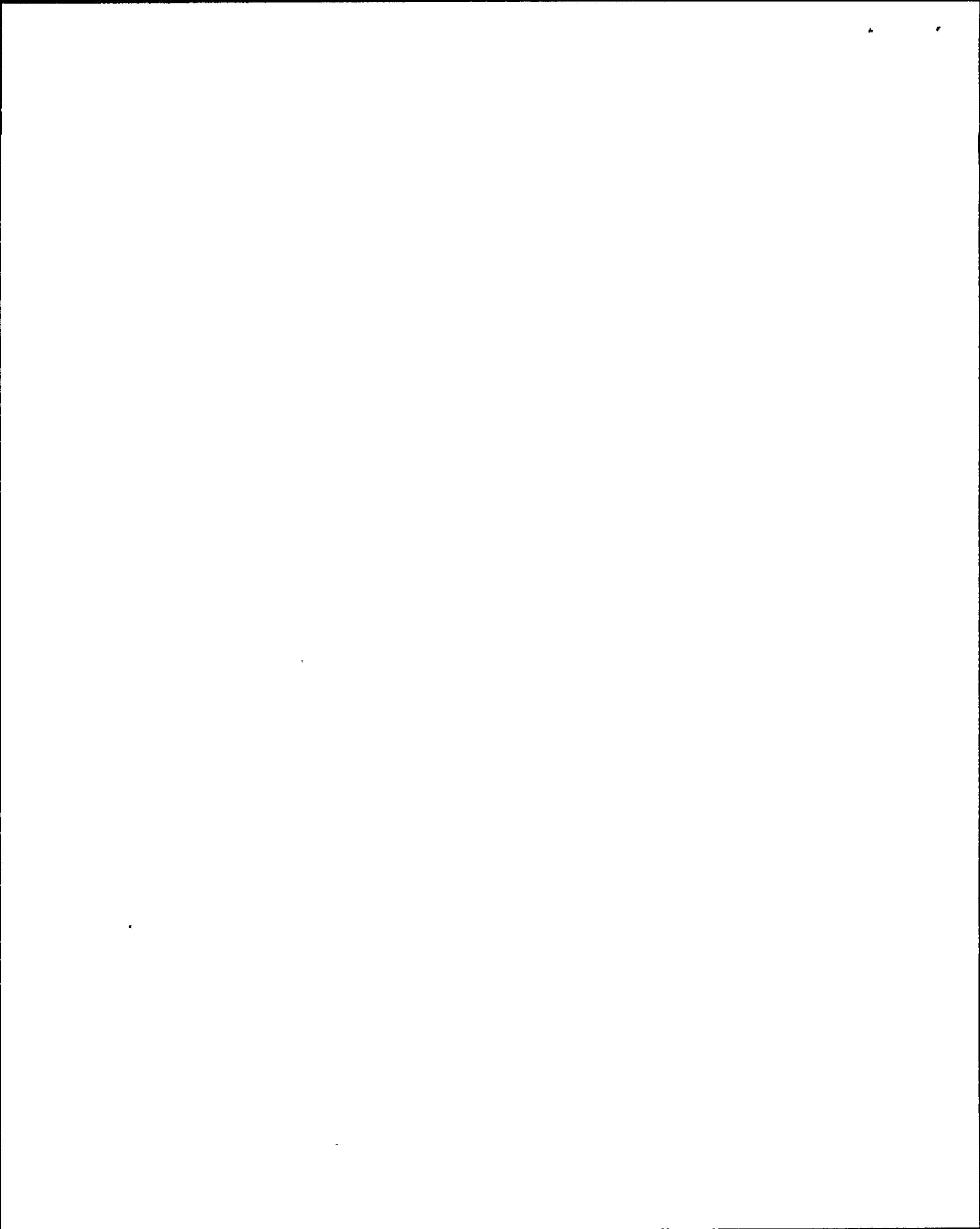
B. FACILITY COMMENT/RECOMMENDATION

- 1. In answer (a.), the High Temperature Fluid (RBCLCW) is the low pressure fluid and the low temperature fluid is the high pressure fluid (Service Water).
- 2. For part (b.), another acceptable answer may be no change in heat transfer. This is based on a stated assumption that the Service Water System Flow increase will not change the Service Water Flow through the Reactor Building Closed Loop Cooling Water Heat Exchangers. The flow will remain fairly constant due to the throttle valves in the Service Water System for the Heat Exchangers. When a service water pump is added, it is in parallel with the other pumps and this will not cause a change in system pressure. Therefore having a constant pressure in the system and a constant throttle valve position the flow through the heat exchanger will not change.

C. REFERENCES:

G.E. Heat Transfer and Fluid Flow, Chapter 6  
P&ID 11  
Attached system data point printout'

SRO Exam Comments -3 April 1989



EXAM COMMENT 4

A. QUESTION: 5.01 (2.00)

In accordance with Procedure N2-OP-101C, "Plant Shutdown", STATE FOUR (4) methods of verifying all rods are fully inserted following a reactor scram. Include panel title and indication that verifies all rods inserted. Limit your response to those indications within the "horseshoe".  
(2.0)

ANSWER: 5.01 (2.00)

1. Full core display (P-603) [+0.25] Red "full in" lights [+0.25]
2. Rod sequence control panel (P-603) [+0.25] Red "full in" lights [+0.25]
3. Rod worth minimizer panel (P-603) [+0.25] White SELECT light when Rod Test button is depressed [+0.25]
4. Process computer [+0.25] (OD-7), Option 2 [+0.25]

REFERENCE:

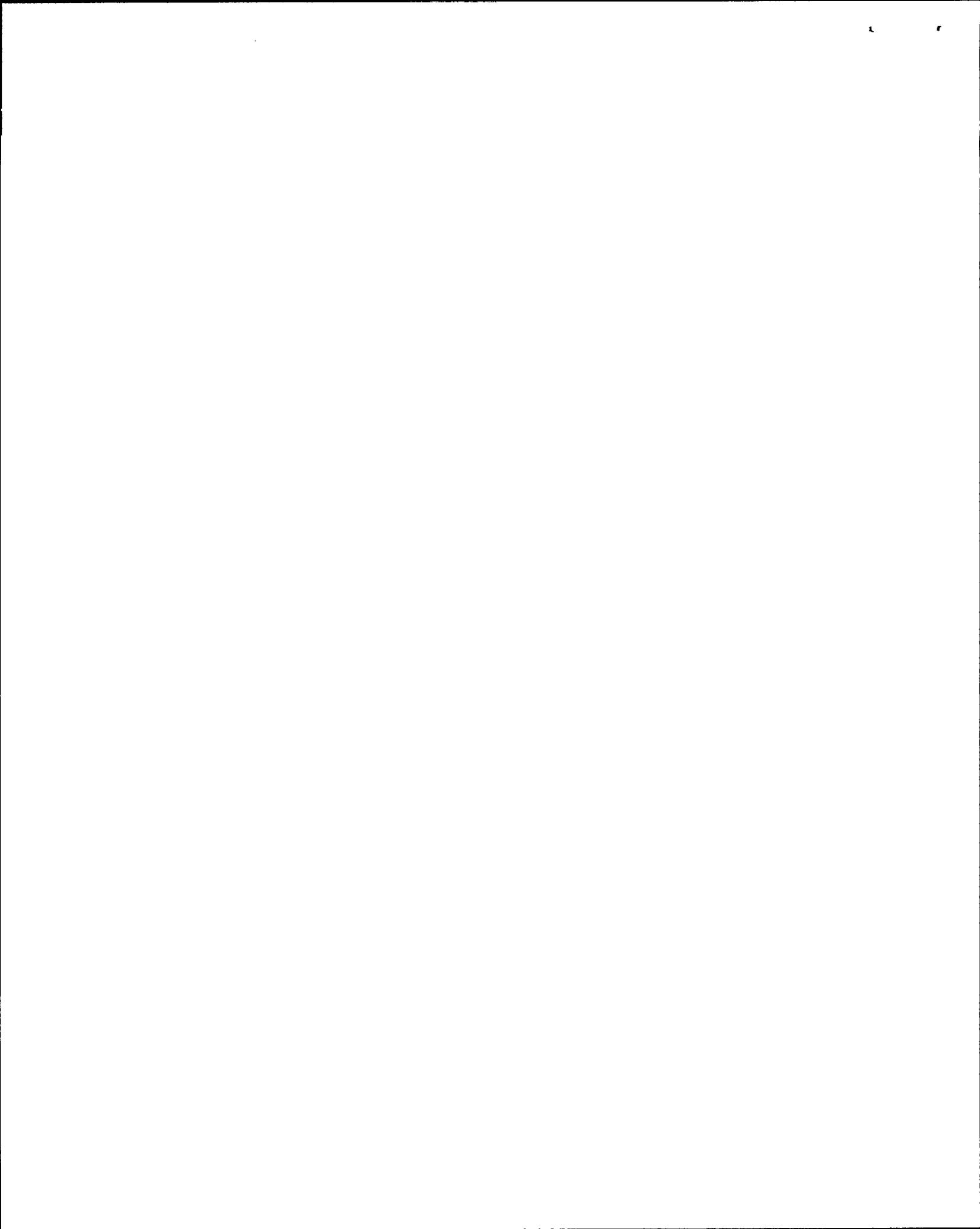
1. NMP2: N2-OP-101C, p. 10

B. FACILITY COMMENT/RECOMMENDATION

1. Answer number one should state green "Full In" lights per N2-OLT-31, p. 4
2. For answer number 4, stating process computer, (OD-7) should be acceptable for full credit per N2-OP-101C, p. 10

C. REFERENCE:

N2-OLT-31, Reactor Manual Control System, Rev. 4  
N2-OP-101C, Plant Shutdown, p. 10



EXAM COMMENT 5

A. QUESTION: 5.02 (2:50)

NMP2 is operating at 90% core power. A spurious FCV runback occurs to minimum position (cause unknown). Core flow decreases to 43%. No reactor protection trip occurred. With respect to N2-OP-29, Off Normal Procedure 8.0, "Sudden Decrease in Core Flow,": A power/flow map is included as Attachment 1.

- a. STATE THREE (3) conditions that would require immediately placing the mode switch in the shutdown position. (1.5)
- b. STATE TWO (2) methods of exiting this region of the power/flow map, other than placing the mode switch in shutdown. (1.0)

ANSWER: 5.02 (2.50)

- a.
  1. Oscillations > 10% peak to peak on any APRM. [+0.5]
  2. Periodic upscale alarms on two or more LPRMs. [+0.5]
  3. Periodic downscale alarms on two or more LPRMs with verifications that the loca flux is experiencing oscillations greater than 20% peak to peak. [+0.5]
- b.
  1. Increasing core flow via FCVs until flow is >45%. [+0.5]
  2. Insert control rods until core thermal power is <36%. [+0.5]

REFERENCE:

1. NMP2: N2-OP-29, p. 30  
295001K104 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

- a. The examination key was limited to three cases based on operating between the 80% and 100% rod line. If it was assumed that operation was greater than the 100% rod line, then a fourth choice exists.

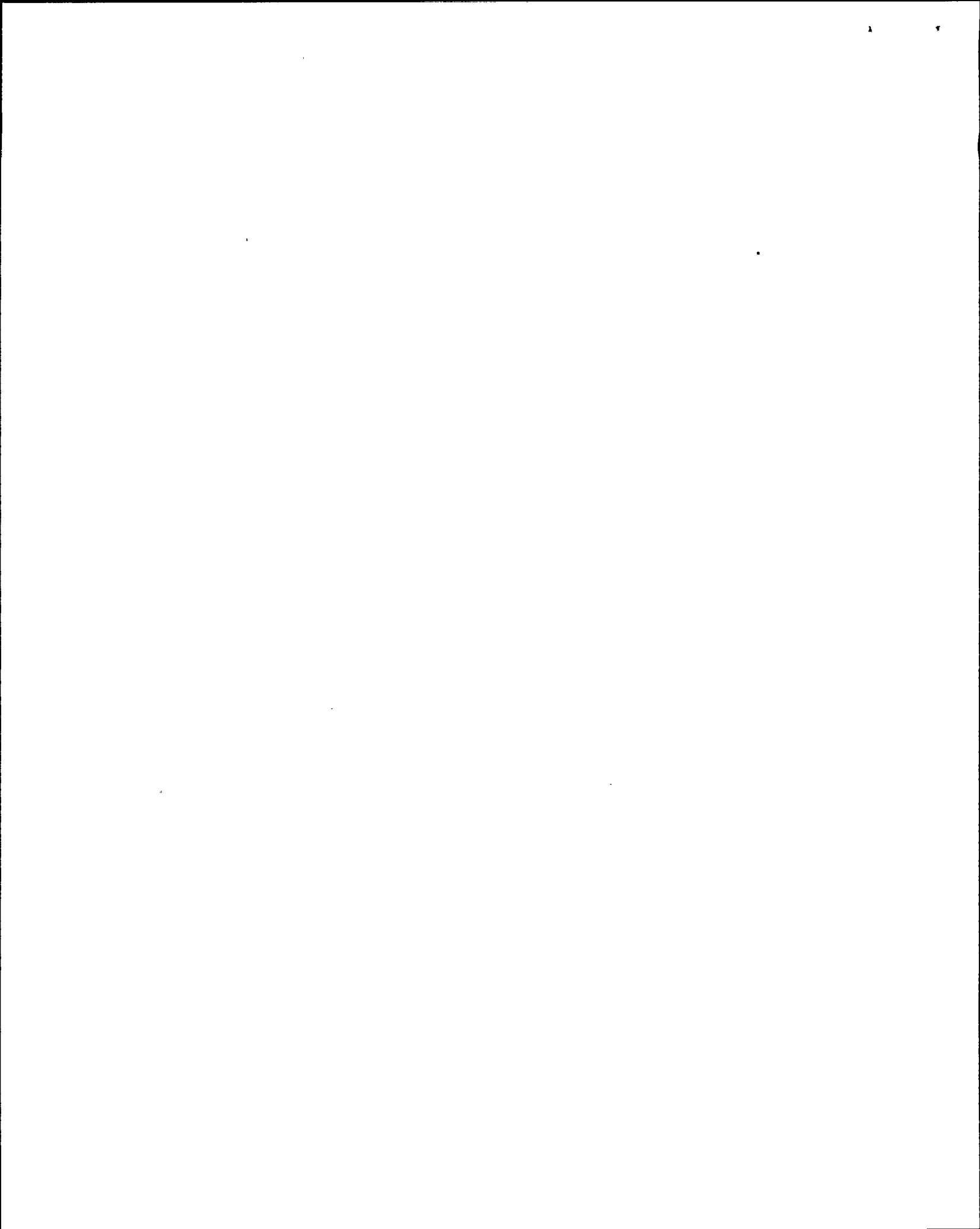
Recommend accepting as another answer if operating greater than the 100% rod line, when core flow decreases to 43%, immediately place mode switch to shutdown (or, simply, if operating greater than the 100% rod line).

- b. The question asked for two methods to exit this region, not the setpoints associated with these actions. The exam key has the setpoints as part of the answer.

Recommend accepting for full credit, answers that do not include the power and flow setpoints.

C. REFERENCE:

- N2-OP-29, Reactor Recirculation System Procedure, p. 30 and 31  
SRO Exam Comments -5 April 1989



EXAM COMMENT 6

A. QUESTION: 5.12 (1.50)

It has become necessary to abandon the control room due to toxic gas. Column A lists immediate actions required by N2-OP-78, "Remote Shutdown System". For each action in Column A, SELECT the SINGLE (1) job title who has responsibility to PERFORM this action from Column B. (1.50)

COLUMN A	COLUMN B
a. Verify transfer of in house loads	1. CSO
b. Place mode switch in "Shutdown"	2. Control Room "E" Operator
c. Place DIVI and DIVII diesel main- tenance switches in "Local" positions	3. SSS/ASSS
d. Trip the main turbine	4. Radwaste Auxiliary Operator D
e. Verify scram using full core display or RSCS display	
f. Announce control room evacuation over the control room gaitronics	

ANSWER: 5.12 (1.50)

- a. 2.
- b. 1.
- c. 3.
- d. 2.
- e. 1.
- f. 1.

[+0.25] each

REFERENCE:

NMP2: N2-OP-78, Section H.1.1

B. FACILITY COMMENT/RECOMMENDATION

If the candidate states the assumption that actions could not be carried prior to control room evacuation, other acceptable answers may change to the following:

- d. 3.

C. REFERENCE:

NMP2: N2-OP-78, Remote Shutdown System, Rev. 3, Dated 8/20/87



EXAM COMMENT 7

A. QUESTION: 5.16 (2.00)

The reactor has failed to automatically scram on a valid scram signal. STATE FOUR (4) alternate methods of inserting control rods into the reactor. Valve numbers, switch numbers, etc. are not required. (2.0)

ANSWER: 5.16 (2.00)

1. Deenergize scram solenoids
2. Vent scram air header
3. Open individual scram test switches
4. Perform manual scrams
5. Drive control rods
6. Vent HCU exhaust header

[+0.5 each] Any 4 of 6, maximum of [+2.0]

REFERENCE:

1. NMP2: N2-OLP-RQ, p. 14
2. NMP2: N2-OLP-RQ, LO EO-3

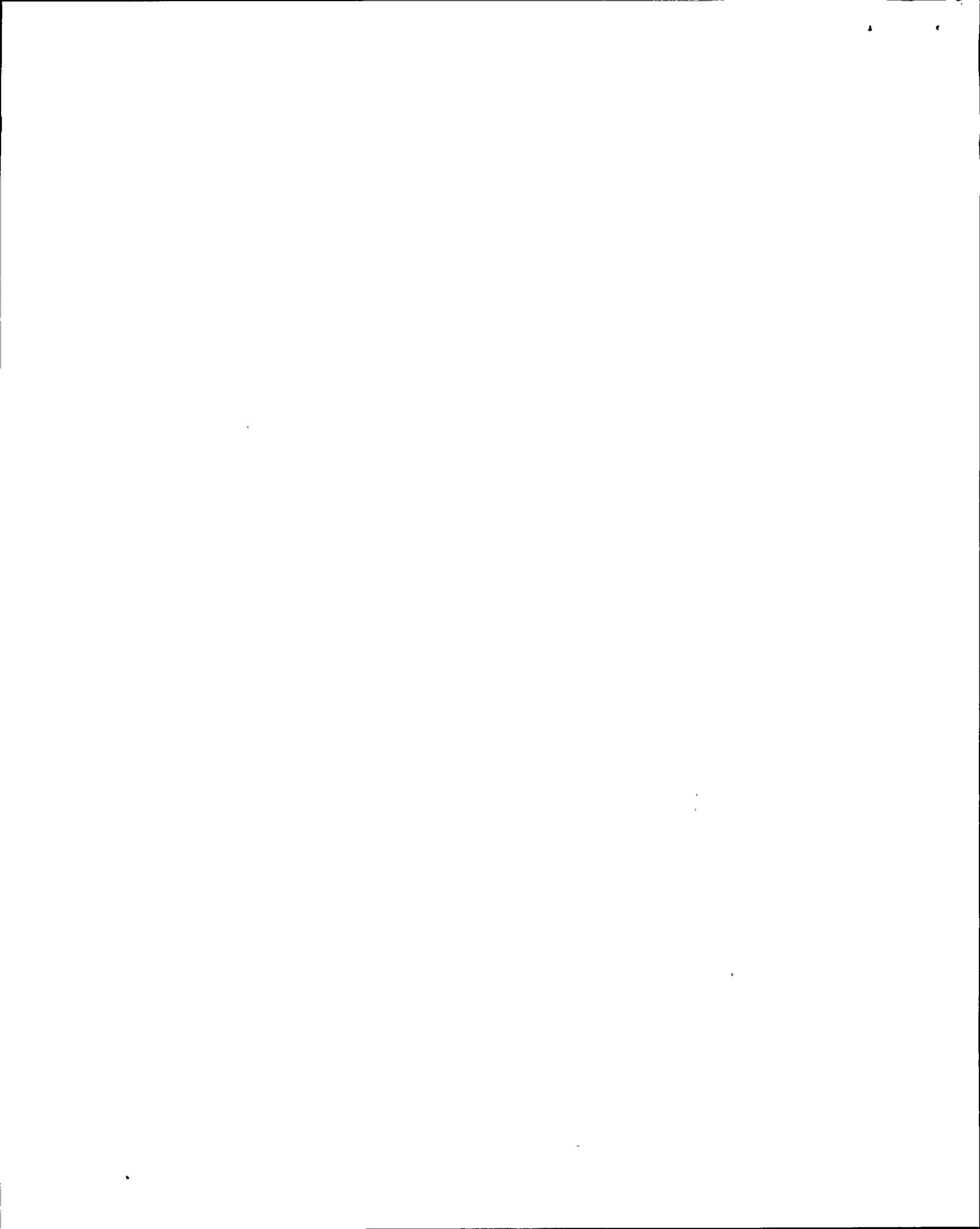
B. FACILITY COMMENT/RECOMMENDATION

Another acceptable answer to add to the list could be:

Initiate ARI

C. REFERENCE:

N2-OP-97, Reactor Protection System, Section H.2, Rev. 2



EXAM COMMENT 8

A. QUESTION: 5.17 (1.50)

Given initiating conditions in COLUMN 1, SELECT the appropriate emergency classification from COLUMN 2. EAP-2 is provided as Attachment 2. (NOTE: Each classification can be used more than once or not at all. If the initiating condition does NOT meet the entry level requirements, state NO CLASSIFICATION REQUIRED.) (1.5)

COLUMN 1 (Condition)	COLUMN 2 (Classification)
a. Confirmed earthquake of 0.09g while at power	1. Unusual Event
b. Unidentified leak rate from Reactor systems of 35 GPM	2. Alert
c. Main steam line break outside drywell with failure of HYV7B and HYV6A MSIV's to close	3. Site Area Emergency
d. Failure of a Low Pressure Turbine wheel where blades penetrate the casing.	4. General Emergency
e. Evacuation of the Control Room and NAOE is unable to get to the Remote shutdown Panel for greater than 15 minutes	
f. Confirmed release from stack with projected dose at the site boundary for child Thyroid >5 Rem	

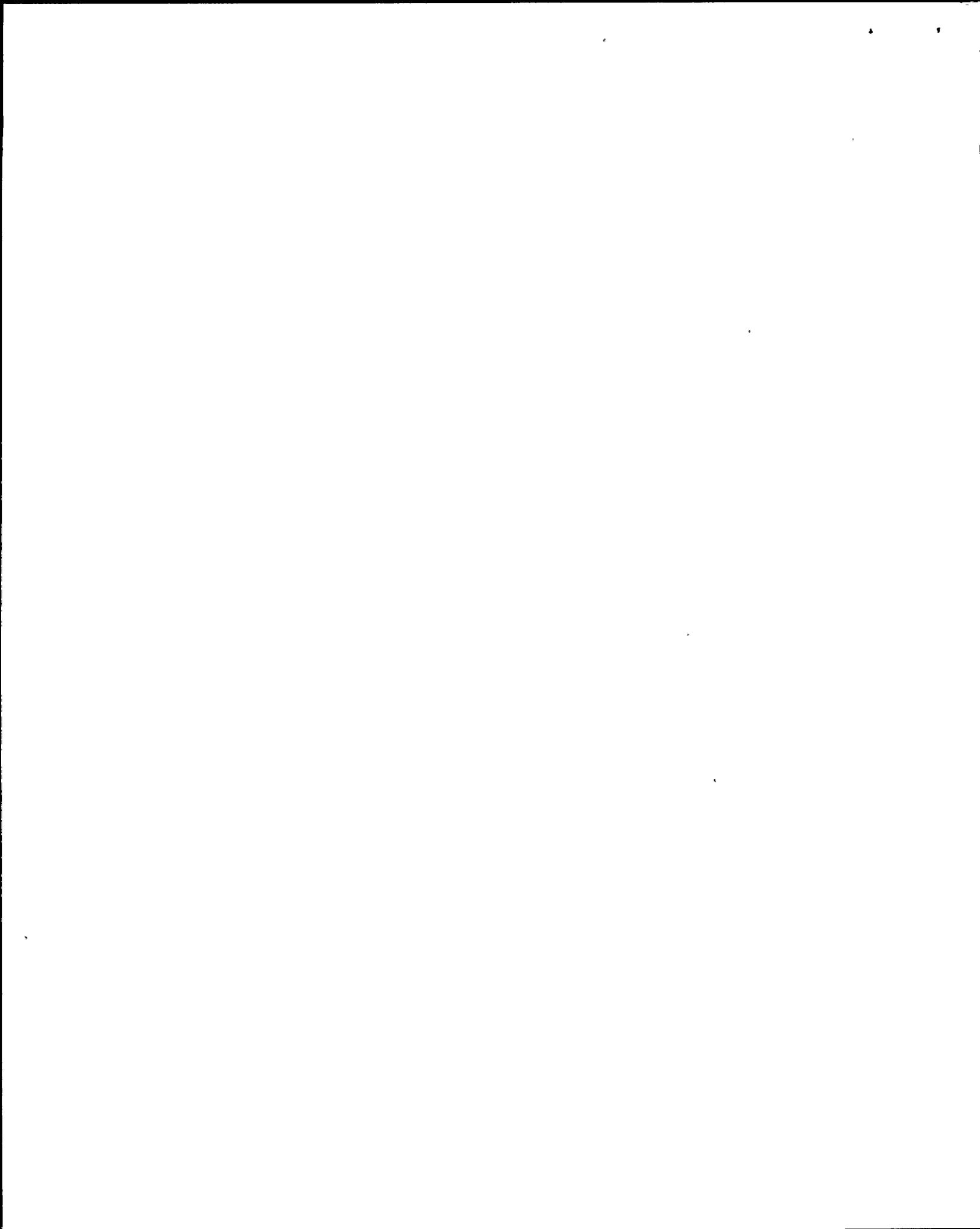
ANSWER: 5.17 (1.50)

- a. 2.
- b. 1.
- c. 3.
- d. 2.
- e. 3.
- f. 3.

[+0.25] each

REFERENCE:

- 1. NMP2: N2-OLP-EAP2, LO 5
- 2. NMP2: N2-EAP-2, Attachment 2  
295038G011 295016G011 295002G011 ..(KA's)



B. FACILITY COMMENT/RECOMMENDATION

- c. The question states that HYV7B and HYV6A fail to close. These valves are in different main steam lines.

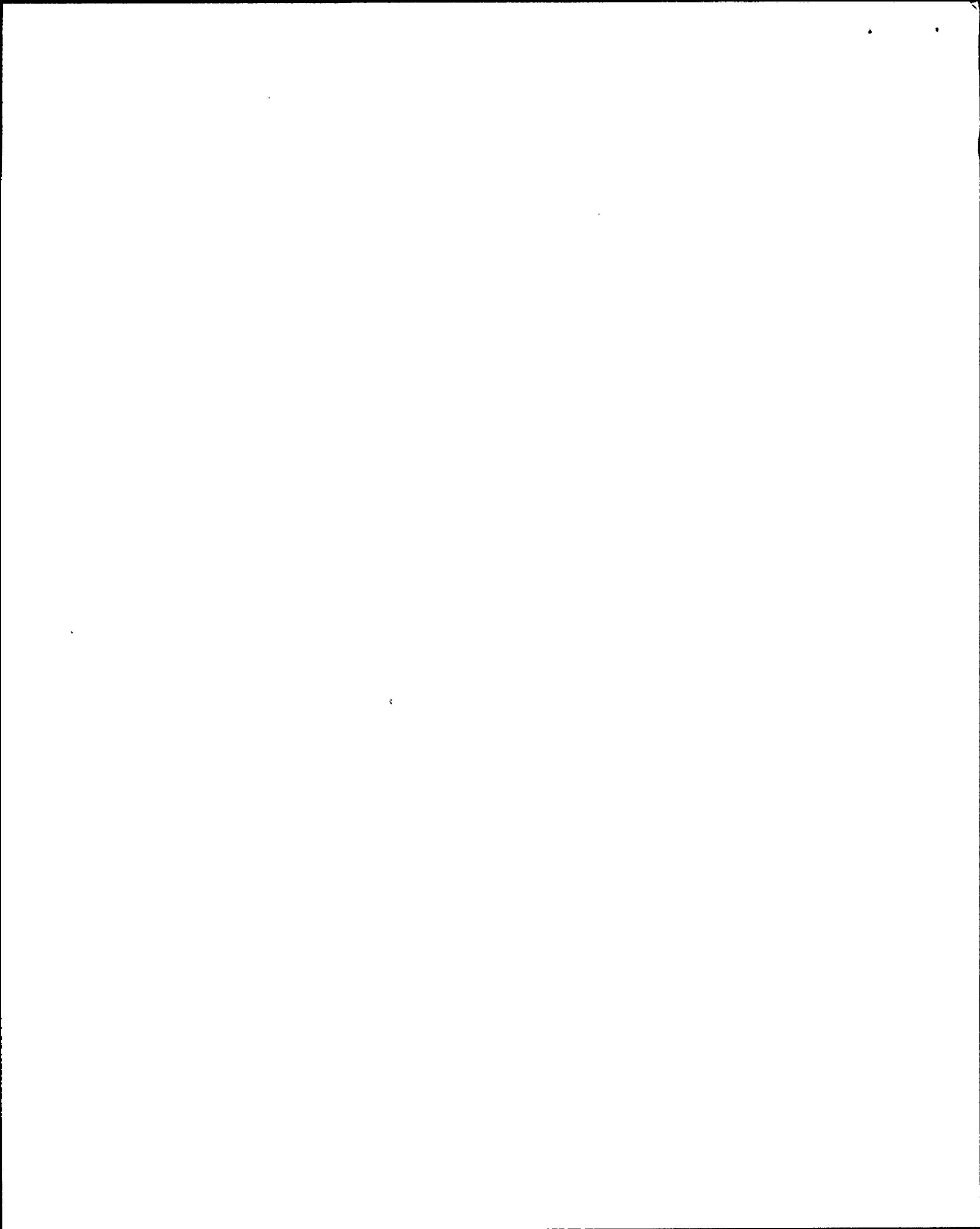
Per EAP-2, page 43, this is classified as an Alert. (Site Area Emergency is indicated by failure of both MSIV's in a common line to isolate) Note: Closure of one valve is sufficient to isolate the line. To meet single failure criteria, it is assumed only one will close.

Recommend changing answer key for c to "2" (Alert)

- e. The answer key response to question e. is Site Area Emergency. Per EAP-2, this is true if it is assumed that control is not transferred to the remote shutdown panel, within 15 minutes. If it is stated that control is assumed by the CSO, (per OP-78, either the CSO or E controls the panel), then it would be an Alert. Recommend accepting either Site Area Emergency or Alert based on assumptions.

C. REFERENCE:

1. S-EAP-2, Attachment 2, Action level criteria for classification of emergency conditions, p. 43 and 49.
2. N2-OLT-21, Primary Containment Isolation System, p. 3
3. N2-OP-78, Remote Shutdown System Procedure, p. 8



EXAM COMMENT 9

A. QUESTION: 6.04 (2.00)

- a. STATE the bases for hydrogen concentration in the offgas train as specified by Technical Specifications of 4%. (0.5)
- b. STATE TWO (2) methods the offgas system uses to maintain the hydrogen concentration below the Technical Specification limit. (1.0)
- c. WHAT specific precaution, according to Procedure N2-OP-42, must be observed when operating the offgas system with hydrogen concentration above the specified limit? (0.5)

ANSWER: 6.04 (2.00)

- a. Maintain hydrogen concentration below the flammability limit. [+0.5]
- b.
  1. reduction via recombiners [+0.5]
  2. dilution via service air [+0.5]
- c. Do not operate any offgas Isolation valve [+0.5] (due to potential for hydrogen explosion).

REFERENCE:

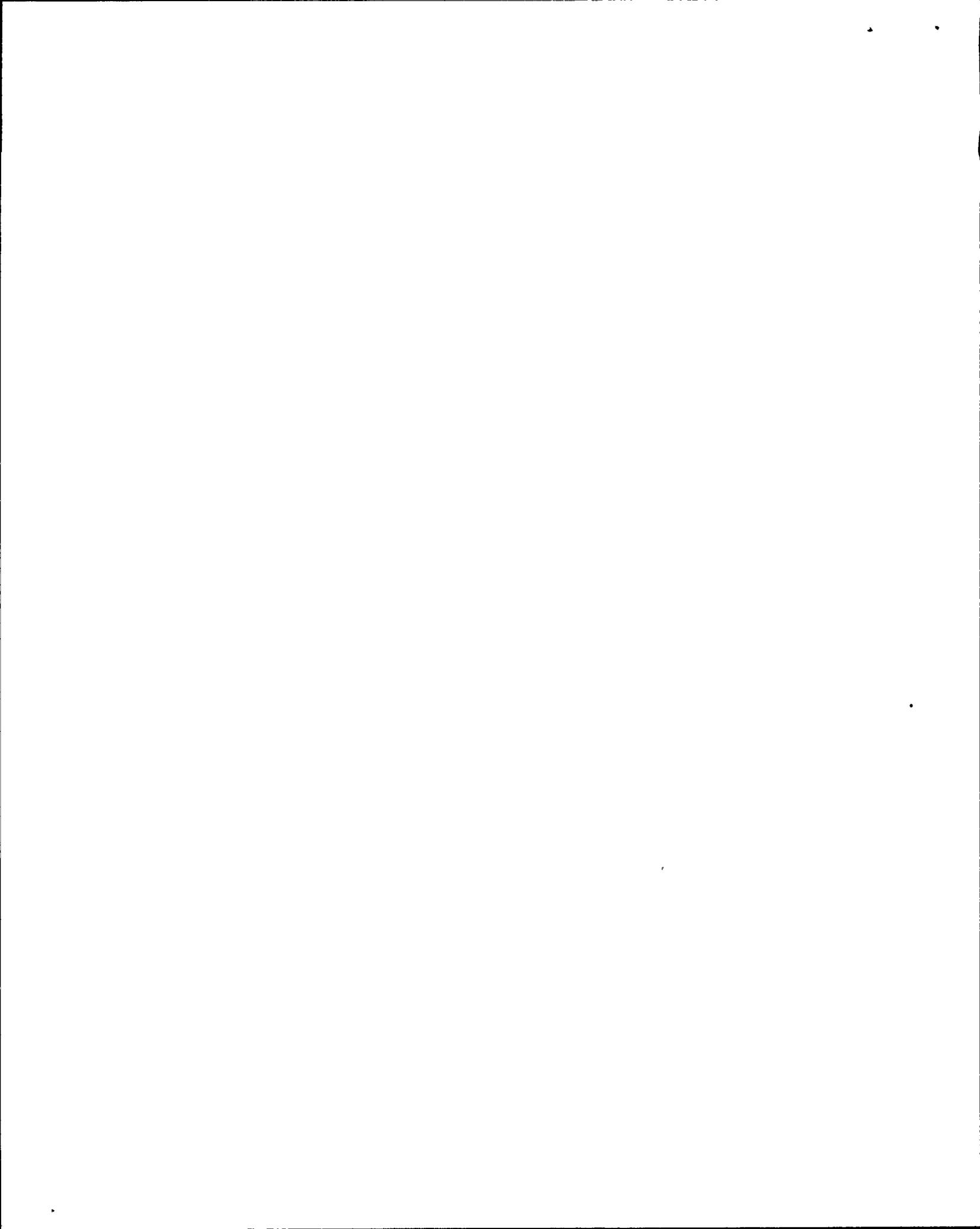
1. NMP2: N2-OLP-52, L.O. 5
2. NMP2: N2-OLP-52, L.O. 9
3. NMP2: N2-OP-42, "Precaution," 8.0, p. 3

B. FACILITY COMMENT/RECOMMENDATION

An additional acceptable answer for part b. could be sufficient auxiliary steam flow through the second stage air ejector to maintain the discharge hydrogen concentration less than 4%, per N2-OLT-52.

C. REFERENCE:

N2-OP-52, Condenser Air Removal and Offgas System, Rev. 4



EXAM COMMENT 10

A. QUESTION: 6.09 (3.00)

An ADS-SRV has failed open. Attempts to close the valve are in progress.

- a. In accordance with N2-EOP-SPT, if the relief valve cannot be closed within \_\_\_\_\_ or before suppression pool temperature reaches \_\_\_\_\_, the mode switch must be placed in \_\_\_\_\_. (1.5)
- b. With the plant operating at 100% power, WHAT are six (6) Control Room indications that one or more Safety Relief Valves are stuck open? (1.5)

ANSWER: 6.09 (3.00)

- a. 5 minutes [+0.5]  
110 deg. F. [+0.5]  
Shutdown [+0.5]
- b. 1. reduction of electrical output  
2. steam/feedflow mismatch  
3. vessel level increases than decreases to stabilize at slightly lower than previous operating level  
4. suppression pool temperature increase  
5. valve indication lights  
6. acoustic monitors  
7. pipe discharge temperature increase
- any six (6) [+0.25] each, +1.5 maximum

REFERENCE:

1. NMP2: EOP Lesson Plan, EOP-SPT  
2. NMP2: N2-OP-34, p. 9

B. FACILITY COMMENT/RECOMMENDATION

Another possible answer for part b. should be per N2-OP-34, Annunciator (601 548, Safety/Relief Valve Open) on Panel 601

C. REFERENCE:

NMP2: N2-OP-34, pps. 9 and 67



EXAM COMMENT 11

A. QUESTION: 6.12 (2.00)

Concerning standby liquid control (SLS):

- a. LIST FOUR (4) Control Room indications that can be used to verify that SLS was performing its design function. (1.0)
- b. SELECT the ONE(1) correct response. In accordance with N2-EOP-RQ, if the SLS pumps became inoperative, sodium pentaborate may be injected through the use of:
  1. RWCU pump
  2. CRD pump
  3. Hydro pump
  4. Post Accident Sampling System

ANSWER: 6.12 (2.00)

- a.
  1. SLS pump running lights
  2. RWCU isolation
  3. SLS storage tank level decreasing
  4. reactor power decreasing
  5. SLS system flow indication
  6. SLS system pressure indication
  7. Squib valve lights extinguished

Any four [+0.25] each

- b. 3. [+1.0]

REFERENCE:

1. NMP2: N2-OP-34, LO 10
2. NMP2: N2-OP-36A

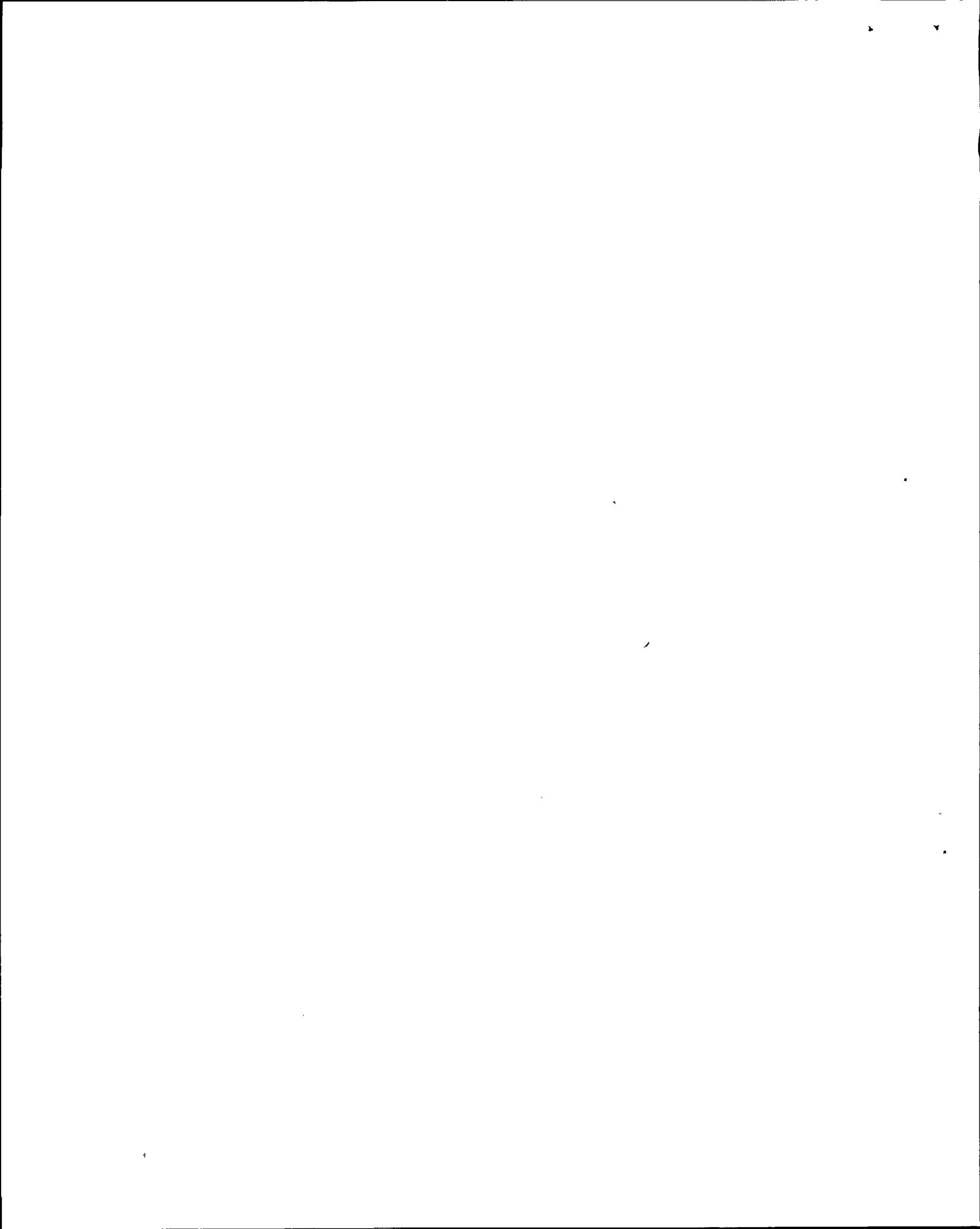
B. FACILITY COMMENT/RECOMMENDATION

The following list are possible additions to the answer for part a., per N2-OP-36A;

1. SLC Storage Tank Outlet Valves (Pump Suction Valves)  
SLS\*MOV1A and MOV1B open
2. SLS pump running can also be indicated by pump ammeters on P601

C. REFERENCE:

1. NMP2: N2-OP-36A, "Standby Liquid Control System"
2. NMP2 P&ID 36



EXAM COMMENT 12

A. QUESTION: 6.16 (1.50)

STATE the conditions (THREE (3) required) any of which will initiate the reverse motion block #1 on the Refueling Bridge when one or more of the control rods are withdrawn. Setpoints are not required. (1.50)

ANSWER: 6.16 (1.50)

Main hoist loaded [+0.5]  
Frame auxiliary hoist loaded [+0.5]  
Monorail auxiliary hoist loaded [+0.5]

REFERENCE:

1. NMP2: N2-OLP-2, LO 2-5
2. NMP2: N2-OP-39, p. 14

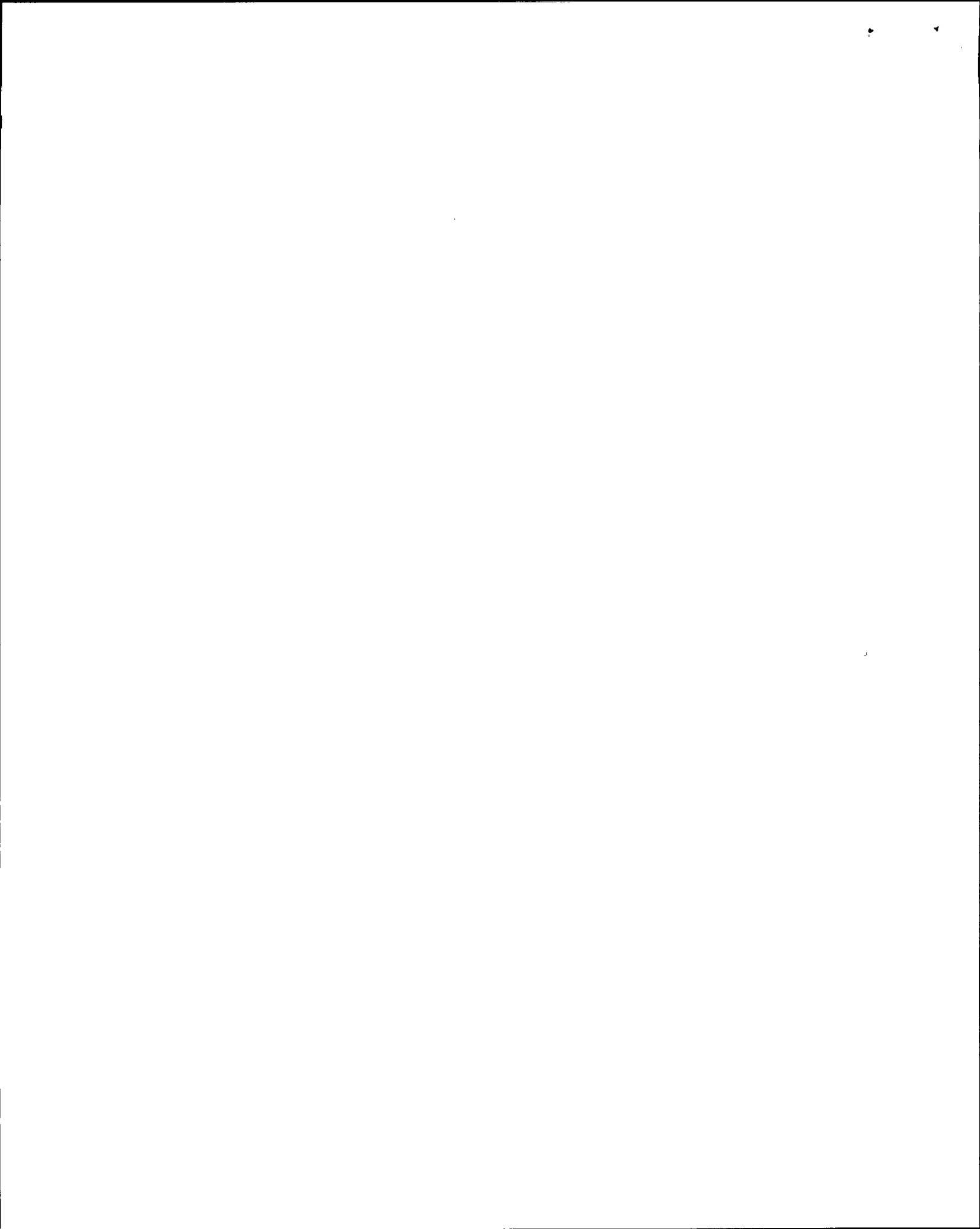
B. FACILITY COMMENT/RECOMMENDATION

A possible addition to the list of acceptable answers could be (per N2-OP-39):

Reactor mode switch in startup and the bridge is over the core

C. REFERENCE:

NMP2: N2-OP-39, p. 14



EXAM COMMENT 13

A. QUESTION: 6.18 (1.50)

During an event requiring activation of the emergency plan, STATE the roles assumed by the Station Shift Supervisor (SSS) and Assistant Station Shift Supervisor (ASSS) (1.50)

ANSWER: 6.18 (1.50)

SSS is the SRO in charge of control room operations [+0.5]  
SSS is the Emergency Director until relieved [+0.5]  
ASSS is the STA [+0.5]

REFERENCE:

1. NMP2: N2-OLP-APH, LO 4
2. NMP2: AP-4.0, p. 4  
294001A116 ..(KA's)

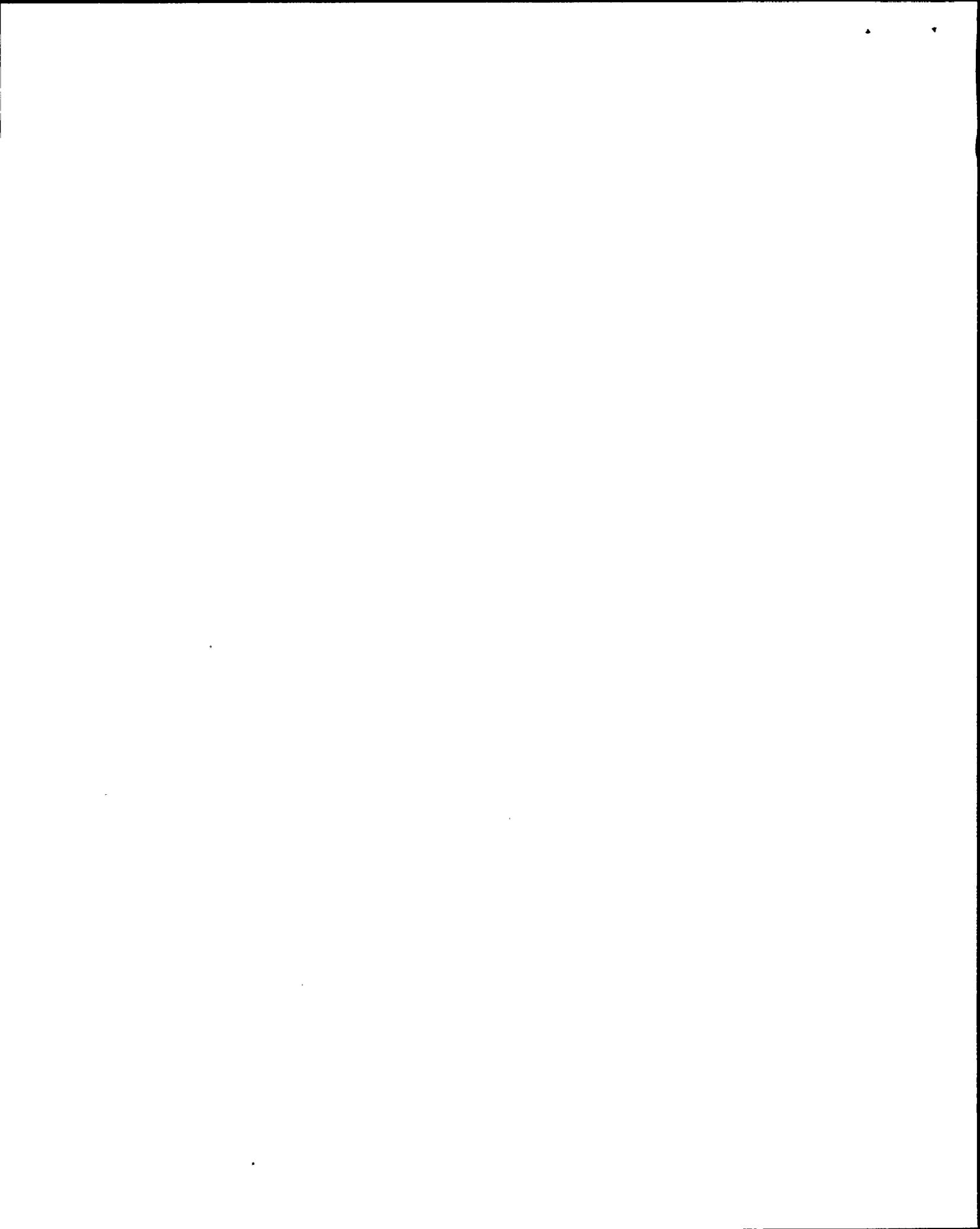
B. FACILITY COMMENT/RECOMMENDATION

The SSS, while in the control room, is the SRO in charge of the control room during all power operations, and is also in that position anytime upon returning. When an emergency is declared, per Station Procedure EAP-1, he assumes the role of Site Emergency Director.

Recommend limiting complete answer for the role the SSS assumes to Emergency Director.

C. REFERENCE:

S-EAP-1, Activation and Direction of the Emergency Plans, p. 4



EXAM COMMENT 14

A. QUESTION: 6.22 (2.00)

Concerning the Safety Parameter Display System (SPDS):

- a. WHAT is the significance of a white numeric field followed by a yellow "Q"? (0.5)
- b. WHAT is the significance of a blank field followed by "N"? (0.5)
- c. WHICH safety function block(s) is/are placed in an alarm condition upon high drywell pressure? (1.0)

ANSWER: 6.22 (2.00)

- a. Value of parameter in doubt. (Requires validation). [+0.5]
- b. Value of parameter is unknown. [+0.5]
- c. Coolant System integrity [+0.5]  
Containment integrity [+0.5]

REFERENCE:

- 1. NMP2: N2-OLP-37, LOs 4, 5, 6, and 7
- 2. NMP2: N2-OLP, pp. 7, 8, and 9  
294001A115 ..(KA's)

B. FACILITY COMMENT/RECOMMENDATION

The SPDS text identifies the white "N" indicates value unknown or "failed" indicating no value. No inputs should be considered for full credit as it describes failed inputs.

C. REFERENCE:

N2-OLT-37, pp. 5



KEN SWEET

ATT 1

NY NIAGARA  
NU MOHAWK

INTERNAL CORRESPONDENCE

FCRM 1122 R 02-80

56-01-013

FROM T. W. Roman *T. W. Roman*  
R.B. Abbott *R.B. Abbott*

DISTRICT Nine Mile Point Units 1 and 2

TO Department Heads  
Unit Supervisors

DATE February 19, 1987 FILE CODE NMP20774

SUBJECT Resetting Protective Devices

1. Protective devices that have responded to a condition should not be reset unless the cause is known. This is especially true in a case if the breaker is tripped and the overloads are not.
2. Minimum personal protective equipment for operating breakers is gloves, hard hat, and safety glasses.
3. In case of emergency, when protective devices must be immediately reset without the cause of the trip being known, more care should be taken in case a breaker should fail. Extra protection should be considered such as a face shield and rubber gloves.

TWR/RBA/fam

cc: T. J. Perkins  
R. Q. Piron  
J. Weagraff

RECEIVED

APR 29 1987

SAFETY DEPT.  
SYRACUSE

1

- g. Any record sheets or cards required for these operations shall be completed. Mark-Up Sheets are required at the control point. (Exhibits 907.04 and 907.05.)

#### 901.04 ISSUING THE MARK-UP

This means the permission from the Controller to the Mark-Up man to begin work after taking all necessary precautions. This permission shall state definitely the line or piece of equipment involved and the exact section by naming the locations and switches or valves for which tags have been placed and whether a Red or Blue Mark-Up. The language used shall be substantially as follows for a typical case:

"You, John Jones, have Red Mark-Up No. 2179 on Martin-Jamesville Line No. 1, between switches (or valves) 11 and 15 at Jamesville, 4 and 7 at Martin, and 14 at Station 24, all of which switches (or valves) are in the Protective Position and Red Tagged for you. Test and then ground at your point of work before considering the circuit dead."

#### 901.05 TESTING AND GROUNDING

After a Mark-Up has been issued to the Mark-Up man he shall satisfy himself (having personally made or directed a test) that the circuit or equipment has been de-energized. Unless otherwise specified he shall immediately have Protective Grounds applied. It is important that the time between testing and grounding be kept to a minimum.

Portable or permanent grounds specified in Mark-Up Request, which are applied prior to a Mark-Up being issued, or portable grounds requested by the Mark-Up man from the Controller after the Mark-Up is issued, shall be included on the Mark-Up Sheet and tagged.

If Industrial Customer requests portable grounds on our line ahead of their line disconnects, these grounds will be installed and removed by Niagara Mohawk men. These grounds will be included with the Guarantee issued to the Industrial Customer.

#### 902.00 PROCEDURE FOR TERMINATING A MARK-UP

##### 902.01 MARK-CLEAR

Upon completion of the work the Mark-Up man shall clear all workmen from the circuit or equipment and advise them that they shall thereafter consider the circuit or equipment energized. He shall have all the grounds and protective devices removed which he has had placed and shall see that the circuit or equipment is ready for service as far as he is concerned. He shall then report to the Controller and Mark Clear by informing him of the completion of the specific work for which the Mark-Up was issued. When Marking Clear the Mark-Up man shall:

- a. State the Mark-Up type and number.



04-20-89

UNIT 2 PAGE 0

SPECIAL LOG NO. 21 TEST

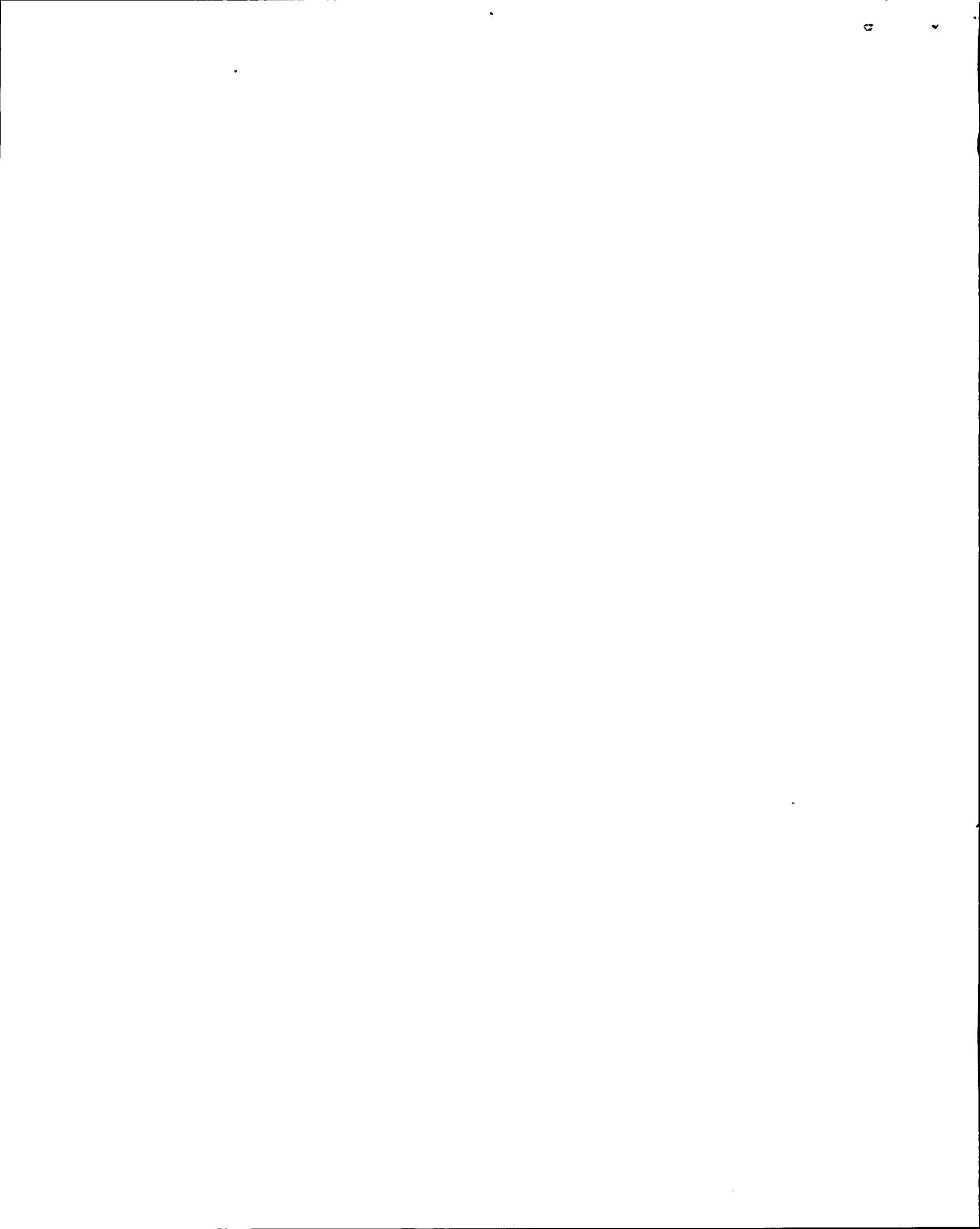
09:21:35	SWPPA25 90.70	SWPPA26 90.40	CCPPA01 44.52
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*PRESS AT HT PX*

*SWPPA25 / SWPPA26 Service Water Pressure*

*CCPPA01 RBCK Water Pressure*

MOORE 204 27



ATTACHMENT 3

NRC RESPONSE TO FACILITY COMMENTS

The following represents the NRC resolution to the facility comments (listed in Attachment 2) made as a result of the current examination review policy. Comments made that were insignificant in nature and resolved to the satisfaction of both the examiner and the licensee during the pre-examination review are not listed (i.e.: typographical errors, relative acceptable terms, minor set point changes).

REACTOR OPERATOR EXAMINATION

Question 1.06: Comment not accepted. Utility reference is from general summary. Page 8-45, 8-46, and 8-47 provide detailed response to the questions originally submitted.

Question 1.11: Comment accepted. Incorporated into answer key.

Question 1.16: 1. Comment accepted. Deleted reference to pressure in answer key.

2. Comment accepted. Assumption must be stated that a change in service water flow will not change flow through RBCCW due to throttle valves in heat exchanger.

Question 2.04: Comment accepted. Incorporated into answer key.

Question 2.13: Comment accepted. Comment taken into consideration during exam.

Question 3.03: Comment accepted. Incorporated into answer key.

Question 3.07: Comment accepted. Incorporated into answer key.

Question 3.14: Comment accepted. Incorporated into answer key.

Question 3.15: Comment accepted. Incorporated into answer key.

Question 3.22: Comment not accepted. Flow control runback is not the cause of the Loop Controllers transferring to manual. A loss of feedpump concurrent with low water level alarm is the common cause of Loop Controllers transfer to manual and Flow Control Valve runback.

Reference: Nine Mile Point 2 - N2-OLT9, page 10

Question 3.24: Comment accepted. Incorporated into answer key.

Question 3.25: Comment accepted. Incorporated into answer key.



Question 3.27: Comment not accepted. Answer remains the same. Reference listed in the Facility comments was not available to the examiner who prepared the exams.

#### SENIOR REACTOR OPERATOR EXAMINATION

Question 4.06: Comment not accepted. Utility reference is from the general summary. Pages 8-45, 8-46, and 8-47 provide detailed response to the questions originally submitted.

Question 4.10: Comment accepted. Incorporated into examination.

Question 4.15: 1. Comment accepted. Incorporated into examination.  
2. Comment accepted. Assumption must be stated that a change in service water flow will not cause a significant change in flow through the RBCLCW due to throttle valves supplying the heat exchanger.

Question 5.01: 1. Comment accepted. Incorporated into examination.  
2. Comment accepted. Incorporated into examination.

Question 5.02: This comment was resolved during pre-exam review on April 17, 1989. Applicants were instructed to state assumptions concerning rod line. Grading will be based upon stated assumptions.

Question 5.12: Comment accepted. If assumption is stated that actions could not be carried out prior to control room evacuation, responses will be graded in accordance with section H.1.2 of N2-OP-78.

Question 5.16: Comment accepted. Incorporated into examination.

Question 5.17: c. Comment accepted. Incorporated into examination.  
e. Comment accepted. Answer is Site Area Emergency unless it is specifically stated by applicant that control of the Remote Shutdown Panel is manned by the CSO in less than 15 minutes. If assumption is correctly stated, it is classified as an alert.

Question 6.04: Comment accepted. Incorporated into examination.

Question 6.09: Comment accepted. Incorporated into examination.

Question 6.12: Comment accepted. Incorporated into examination.

Question 6.16: Comment not accepted. Question specifically addresses reverse motion block #1. N2-OLT-2, page 13 specifically distinguishes between reverse motion blocks #1 and #2. Facility lesson plan N2-OLT-2 page 20 distinguishes between the two (2) refueling bridge interlocks. Sample questions provided by the utility distinguish between the interlocks.



Question 6.18: Comment not accepted. Section 3.4 of AP 4.0 requires the SSS to remain in the control room as the SRO in charge of control room operations specifically when the emergency plan is activated.

Question 6.22: Comment accepted. Incorporated into examination.



ATTACHMENT 4

SIMULATION FIDELITY REPORT

Facility License: NPF 69

Facility Docket No.: 50-410

Operating Test Administered on: 4/19-27/89

This attachment reports examiner observations for information only. These observations do not constitute audit or inspection findings and are not, without further verification and review, indicative of non-compliance with 10 CFR 55.45(b). The observations do not affect NRC certification or approval of the simulation facility other than to provide information which may be used in future evaluations. No licensee action is required in response to these observations.

During the conduct of the simulator portion of the operating tests, the following items were observed.

<u>ITEM</u>	<u>DESCRIPTION</u>
Gatronics	The Gatronics phone system at the back panels was not operative during any operating tests.
Control Rods	Four (4) control rods did not insert following a manual scram resulting from loss of all CRD pumps.
RCIC	The RCIC flow controller did not operate as described in the Cause & Effect manual (RC-08).
Flow Set	The max combined flow set @ 9 to equal 105%. The procedure requires set @ 7.5 to equal 120%.
IC-19 FW-22	A feedwater heater leak results in a scram from 85% power @ 50% severity. The cause & effect manual states recovery from 100% power, 100% severity.

