

LaSalle County Station Initial License Examination

Written Examination

Post Examination Comments and Documentation



LaSalle Station

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10CFR50.4

RA12-056

November 08, 2012

U. S. Nuclear Regulatory Commission
Attention: NRC Region III Administrator
2443 Warrenville Rd.
Suite 210
Lisle, IL 60532-4352

LaSalle County Station, Units 1 and 2
Facility Operating License Nos. NPF-11 and NPF-18
NRC Docket Nos. 50-373 and 50-374

Subject: Comments on NRC Initial License Examination administered the weeks of October 22 and October 29, 2012

In accordance with NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 9, Supplement 1, Exelon Generation Company, LLC, (EGC) submits comments for your review on the examination administered during the weeks of October 22 and October 29, 2012.

Attachment I provides the examination comments in accordance with the guidelines in revision 9, Supplement 1, of NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," ES-402, "Administering Initial Written Examinations".

Attachment II provides the marked up contended questions along with supporting reference documentation.

Should you have any questions concerning this letter, please contact Mr. Guy V. Ford, Regulatory Assurance Manager, at (815) 415-2800.

Respectfully,

Harold T. Vinyard
Plant Manager
LaSalle County Station

Enclosures

cc: Chief, NRC Operator Licensing Branch (with enclosures)
Senior Resident Inspector - LaSalle County Station (w/o enclosures)

NOV 9 2012

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LaSalle County Station NRC Initial License Examination Comments

A review of the NRC ILT examination administered at LaSalle County Station during the weeks of 10/22 and 10/29, 2012 was conducted on Friday, 11/2/12 with all examinees participating in the review.

During the administration of the written examination, eight (8) different license applicants asked questions related to the exam. The exam question number, license applicant's question, and the facility's reply are included below.

During the Post-Exam review, two (2) candidates commented on questions. Docket Number 55-3648 has challenges on five (5) questions having two possible answers utilizing TQ-AA-151-F11 (see attached). The challenge and station's responses to this TQ-AA-151-F11 comment sheet begin on page 4 of this Attachment.

Docket Number 55-3649 commented on four (4) questions, but did not specify any challenges.

WRITTEN EXAM Questions asked/ Proctor Response

Question 2:

Examinee Docket Number 55-33642 asked:

Distractor C states, Increasing TBCCW Expansion Tank Levels. Should this question be answered based on plant conditions?

The answer provided was: Per Nureg 1021 Appendix E B.7 all questions should be answered based on plant conditions.

Question 7:

Examinee Docket Number 55-33650 asked:

Is the synchroscope in the 12 O'clock position on Unit 1 or Unit 2?

The answer provided was: Based on Unit 1 unless stated otherwise.

Question 9:

Examinee Docket Number 55-33642 asked:

Is the indication given stable or a snapshot shown?

The answer provided was: Answer based on given information.

Question 11:

Examinee Docket Number 55-33643 asked:

Should I assume the pumps are going to trip when I put water in them?

The answer provided was: Answer based on LGA-002 Bases.

Question 13:

Examinee Docket Number 55-33643 asked:

Is the RPS MG Set Fine?

The answer provided was: You have all the information you need.

Question 15:

Examinee Docket Number 55-33648 asked:

Are the DG room CO₂ timers timed out?

The answer provided was: You have all the information you need.

Question 18:

Examinee Docket Number 55-33650 asked:

Is the term FIRST in the question stem based on lapse in time or right away?

The answer provided was: No time specified. If we wanted a delay in time would have provided one.

Question 22:

Examinee Docket Number 55-33641 asked:

Are we supposed to know which switch is associated with the alarms given?

The answer provided was: Knowledge you need to have.

Question 30:

Examinee Docket Number 55-33642 asked:

Is the second refuel floor ARM C or D detector?

The answer provided was: You have all the information you need.

Question 33:

Examinee Docket Number 55-33649 asked:

Does the term stable mean no movement?

The answer provided was: Answer based on your knowledge.

Question 34:

Examinee Docket Number 55-33641 asked:

CRD Flow Controller Image: Which controller is this in the simulator? (The simulator currently has a different controller than the plant)

The answer provided was: Identified controller in the simulator with Manual and Auto on the bottom.

Question 37:

Examinee Docket Number 55-33640 asked:

Can you tell me what PT 1 and PT 2 says in the circle?

The answer provided was: PT 1 is PS and PT 2 is PTS. (Based on the poor picture clarity candidates could not clearly identify the terms in the circle.)

Question 58:

Examinee Docket Number 55-33644 asked:

Does the term re-entry imply you had a transient?

The answer provided was: Transient does not matter to answer the question.

Question 79:

Examinee Docket Number 55-33641 asked:

Is there an alarm indication?

The answer provided was: There are no alarms up based on the picture.

Question 97:

Examinee Docket Number 55-33640 asked:

Are EAL bases required to be memorized?

The answer provided was: You do not need EAL bases to answer the question.

Post-Exam Review Comments made by Docket # 55-33648.

1. RO Question #10

Question #10 on the RO exam has the correct answer as (C), which is correct per LOP-AA-03 Table 2 Sheet 1.

Candidate Comment: The comment made was when a Flow Unit fails to 0% a Downscale/INOP condition would cause a Rod Block ONLY, which is answer (B).

Station's Response: Based on the Lesson Plan provided and LOP-AA-03 Table 2 Sheet 1 you would not receive an INOP condition without making assumptions that the Flow Unit mode switch is not in operate, module was unplugged or the power supply out of specified range. A Downscale condition does exist, which would cause a Rod Block and a Half-Scram. The Half-Scram is caused by exceeding the Flow Biased setpoint.

STATION RECOMMENDATION: ACCEPT ONLY (C) as the correct answer.

2. RO Question #35

Question #35 on the RO exam has the correct answer as (C), which is correct per System Description 047.

Candidate Comment: The comment made was when “??” is displayed it represents 4 rods that have Data Faults, which is answer (A) and is also correct based on new technical information.

Station's Response: The rod position text that is displayed by RCMS is based on the output value from the rod position indication system (RPIS) portion of the system. Per system description 047, a Probe Multiplexer (MUX) card not responding will cause an RPIS '255' signal to be generated which will then display “??” for the 4 rods controlled by that Probe MUX card.

This new technical information (**GE Propriety Class III Information data sheet DO NOT RELEASE**), shows that when a code 255 is present, a data fault bit is present (DF) and thus a data fault would be displayed on RCMS screens. This would make (A) a correct answer as well due to the limited information in the stem.

STATION RECOMMENDATION: ACCEPT BOTH (A and C) as correct answers.

3. RO Question #48

Question #48 on the RO exam has the correct answer as (A), which is correct per LOA-WR-101.

Candidate Comment: The comment made was that a loss of WR also has an impact on RWCU (RT) Pump motor and should be monitored making answer (D) correct.

Station's Response: RWCU (RT) pumps are cooled by WR, but are not required to be monitored in LOA-WR-101. Steps C.2.2, of the discussion section, and B.1.5, of the Reduced Cooling Capacity section, both specify monitoring the RR Pump Seal temperatures.

STATION RECOMMENDATION: ACCEPT ONLY (A) as the correct answer.

4. RO Question #60

Question #60 on the RO exam has the correct answer as (B), which is correct per LGA-003 and LGA-011 Emergency procedures.

Candidate Comment: The comment made was that the plant is below 2% Hydrogen indication, therefore the Hydrogen leg of LGA-003 would not be entered making answer (A) correct as well.

Station's Response: LGA-003 lesson plan states if LGA-003 is entered than parallel execution is also required because of the symptomatic approach to emergency response precludes the prioritization of any one action path since independence for initiating events and transients must be maintained. Therefore the Hydrogen leg of LGA-003 is entered because the stem of the question states Hydrogen is 1% and rising slowly, which leads to entering LGA-011 and starting the Hydrogen Recombiner.

STATION RECOMMENDATION: ACCEPT ONLY (B) as the correct answer.

5. RO Question #74

Question #74 on the RO exam has the correct answer as (B), which is correct per LOP-NR-06.

Candidate Comment: The comment made was based on when the RB TIP ROOM RAD HI/DOWNSCALE alarm comes in. It is possible the alarm was caused by the second TIP run and the TIP run should be placed in a safe condition until the cause of the alarm is verified thus making answer (D) also correct.

Station's Response: The stem of this question indicates that the "B" TIP has just been completed and has been returned to its shield. The "A" TIP has just been positioned at 0001. At this point, the question states the TIP Room Area Radiation Monitor alarms and it is verified to be "HI".

To answer the question based only on the data provided without assumptions, the following logical approach is expected. The first operator response to an alarm is to follow the panel alarm procedure, in this case LOR 1H13-P601 B211.

This procedure has the operator read the corresponding Area Radiation Monitor (ARM) to determine actual radiation level and also refer to the ARM abnormal response procedure, LOA-AR-101. The magnitude of the dose rate level is not provided and it is not stated whether this is due to known reasons, thus the steps of LOR 1H13-P601 B211 and LOA-AR-101 properly direct actions. These procedural steps direct appropriate actions to place the equipment in a safe condition. To place a TIP in a safe condition is to withdraw it into its shield and close the TIP ball valve.

While execution of a TIP trace set typically does lead to receipt of alarm 1H13-P601 B211, the question does not contain enough details that assure that this is an expected alarm condition. Proper panel alarm and abnormal response procedure actions lead to placing the equipment in a safe condition. This response leads to answer (D) also being a correct answer.

STATION RECOMMENDATION: ACCEPT BOTH (B and D) as correct answers.

Exam Comment Sheet

Date: 11-2-2012

Submitted By: Sabah Shams

RO SRO

Sheet 1 of 2
11/02/12

ExamSection(s): Written / Walk-Through / Simulator Scenario

Test Item (Question/JPM/Scenario, etc.)	Concern or Problem	Recommended Resolution	Reference	Remarks
All questions ¹¹⁻⁵⁻¹² ✓ #10	Note ¹¹⁻⁵⁻¹² flow unit 0% should be downscale/INOP	None ¹¹⁻⁵⁻¹² Downscale/INOP brings in ROD Block. Accept Rod block as correct answer	N/A ¹¹⁻⁵⁻¹² Lesson Plan and other reference material List Rod Block as result.	None ¹¹⁻⁵⁻¹² see post exam write up
✓ #35	"??" indication represents Data Faults. 4 Rods can have Data Faults.	DATA fault accepted as correct.		see post exam write up
✓ #48	C.S. of LOA-WR-101 Lists components of concern when RBCCW is degraded. RWCU pps are listed.	Accept RWCU Pump Motor water out. Temp as correct choice	LOA-WR-101 C.S. Page 13	see post exam write up

Additional comments: None

Exam Analyzer comments: see write up summary

Final Resolution: see write up summary

Reviewed by:  11-5-12
 Facility Author Date

Approved by:  11-5-12
 Facility Representative / Date

Exam Comment Sheet

Date: 11/2/2012

Submitted By: Sabah Shams

RO SRO

Sheet 2 of 2

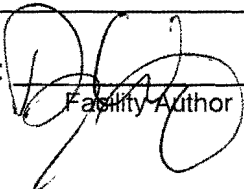
ExamSection(s): Written / Walk-Through / Simulator Scenario


Test Item (Question/JPM/Scenario, etc.)	Concern or Problem	Recommended Resolution	Reference	Remarks
#60	LG4 003 Entry Conditions list H ₂ at 2% or more as concern, once H ₂ reaches 2% start Recombiner	Accept 'A' as correct based on LG43 Entry Conditions and monitor till H ₂ reaches 2% and then desirable to start H ₂ Recombiner.	LG4 003	see post exam write up
#74	AS question stated where Alarm comes in AT the second trip run. SAFE thing to do is withdraw to ins hold and close ball valve until actual condition verified.	LOR response. based on conditions as presented A IN TEST question. "D" as correct also	LOR	see post exam write up

Additional comments: None

Exam Analyzer comments: see write up summary

Final Resolution: see write up summary

Reviewed by:  11-5-12
 Facility Author Date

Approved by:  11-5-12
 Facility Representative / Date

Marked-Up contended Questions and Supporting Reference Documentation
(33 pages)

EXAMINATION ANSWER KEY

11-1 NRC RO Exam

10

ID: 215005 K5.05

Points: 1.00

Unit 1 is operating at 100% of rated thermal power operating on the 100% Flow Control Line

- All nuclear instruments are operable
- The C Flow Unit fails to 0%

Based on the above conditions, which of the following correctly states the effect on the unit?

- A. A Full Scram.
- B. A Rod Block ONLY.
- C. A Rod Block and a Half Scram.
- D. A Flow Comparator alarm ONLY.

Answer: C

Answer Explanation:

A Control Rod Block will be generated if the following conditions exist while the mode switch is in run:

- Flow Unit Upscale (108%)
- Flow Unit INOP (unplugged, switch not in operate)
- Comparator Trip (10% difference in output flow signals)

A Half-Scram will be generated based on APRM Flow Bias Failing such that power is greater than flow.

A Full Scram signal will be generated is incorrect because you are below the scram setpoint and only have one trip unit in RPS channel A failing. If a Flow Unit in RPS Channel B were to fail to 0% then you would receive a Full Scram.

A Flow Comparator alarm ONLY is incorrect because you have exceeded the Flow Unit upscale setpoint although you would receive the alarm the Rod Block is in.

A Rod Block ONLY signal will be generated on the A RPS channel is incorrect because you have passed the scram setpoint.

Reference: LOR 1H13-P603-A209. LOP-AA-03 Table 2 Sheet 1

Reference provided during examination: N/A

Cognitive level: High

Level (RO/SRO): RO

Tier: 2 Group: 1

K/A: 215005 Average Power Range Monitor/Local Power Range Monitor System

K5.05 Knowledge of the operational implications of the following concepts as they apply to AVERAGE POWER RANGE MONITOR/LOCAL POWER RANGE MONITOR SYSTEM

: Core flow effects on APRM trip setpoints

10 CFR Part 55 Content: 41.5

SRO Justification: N/A

EXAMINATION ANSWER KEY

11-1 NRC RO Exam

Question Source: New

Question History: N/A

Comments:

Associated objective(s):

Given various plant conditions, predict the response of the following supported systems to a loss of the APRM System while operating the system, or on an exam in accordance with student text:

- a. Rod Control Management System
- b. Reactor Protection System
- c. Process Computer
- d. Rod Block Monitor
- e. Oscillation Power Range Monitor

Question #10

IV. Interlocks

A. APRM Trips/Rod Blocks/Alarms

OBJ 044.00.15

TRIP	SETPOINT	REFERENCE
Neutron Flux – High Setdown: Will cause a Reactor Scram if mode switch NOT in RUN	≤20% RTP	TS - Allowable Value (LCO)
	14.5%	LIS – Cal Setpoint
	15%	LOR – Setpoint
Neutron Flux – High Setdown: Will cause Alarm/Rod Block if mode switch NOT in RUN	≤14%	TRM - Allowable Value (LCO)
	11.5%	LIS – Cal Setpoint
	12%	LOR – Setpoint
Fixed Neutron Flux – High: Will cause a Reactor Scram	≤120% RTP	TS - Allowable Value (LCO)
	117.5%	LIS – Cal Setpoint
	118%	LOR – Setpoint
Flow Biased Simulated Thermal Power- Upscale: Will cause a Reactor Scram	≤0.61W + 68.2% RTP and ≤115.5% RTP	TS - Allowable Value (LCO): Two Loop
	≤0.54W + 55.9% RTP and ≤112.3% RTP	TS - Allowable Value (LCO): Single Loop
	0.61W + 62.6% RTP and 113% RTP	LIS – Cal Setpoint: Two Loop
	0.54W + 50.5% RTP and 107.5% RTP	LIS – Cal Setpoint: Single Loop
	0.61W + 62.6% RTP and 113.5% RTP	LOR – Setpoint Two Loop
	0.54W + 50.5% RTP and 108.1% RTP	LOR – Setpoint Single Loop
Flow Biased Neutron Flux - Upscale: Will cause Alarm/Rod Block if mode switch in RUN	≤0.61W + 56.9% RTP	TRM - Allowable Value (LCO): Two Loop
	≤0.54W + 44.7% RTP	TRM - Allowable Value (LCO): Single Loop
	0.61W + 50.8% RTP	LIS – Cal Setpoint: Two Loop
	0.54W + 38.7% RTP	LIS – Cal Setpoint: Single Loop
	0.61W + 51.3% RTP	LOR – Setpoint Two Loop
	0.54W + 39.2% RTP	LOR – Setpoint Single Loop
Inoperative Trip: Will cause a Scram/Alarm/Rod Block	1. Too Few Inputs (≤14) or, 2. Module Unplugged or, 3. Function Switch Not in Operate	TS, TRM, LIS, LOR TS requires at least 14 LPRM inputs, LIS sets trip at ≤14
Downscale: Will cause Alarm/Rod Block if mode switch in RUN	≥3%	TRM - Allowable Value (LCO)
	5.5%	LIS – Cal Setpoint
	5%	LOR – Setpoint

Question # 10

Content/Skills

Activities/Notes

TRIP	SETPOINT	REFERENCE
Recirculation Flow Unit Upscale: Will cause Alarm/Rod Block	≤ 111/125 of full scale	TRM - Allowable Value (LCO)
	107.875/125 of full scale	LIS - Setpoint
	108/125 of full scale	LOR - Setpoint
Recirculation Flow Unit Comparator Trip: Will cause Alarm/Rod Block	≤ 11% flow deviation	TRM - Allowable Value (LCO)
	10% flow deviation	LIS - Setpoint LOR - Setpoint
Recirculation Flow Unit Inoperative Trip: Will cause Alarm/Rod Block	1. Mode Selector Switch not in OPERATE 2. Internal power supply out of specified range 3. A card is removed from the flow limit card cage	TRM, LIS, LOR

EXAMINATION ANSWER KEY

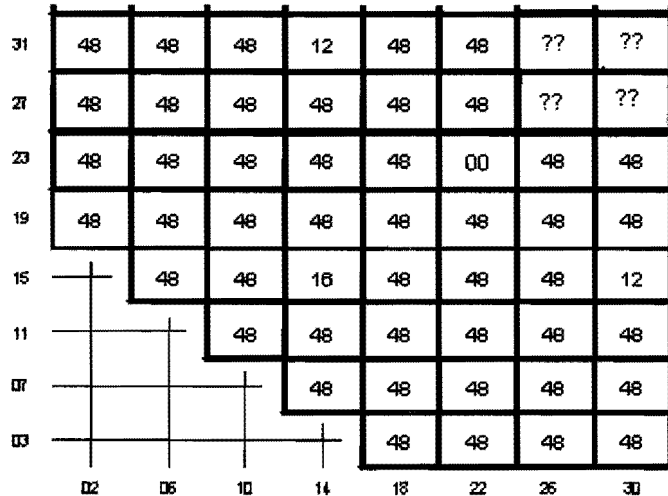
11-1 NRC RO Exam

35

ID: 214000 A3.01

Points: 1.00

Unit 1 is at rated power when the operator observes the following:



Which of the following is the cause of these indication for the four control rods in the red box?

- A. Data Faults
- B. Rods are at the overtravel position
- C. Probe MUX Card not responding
- D. No position switches are CLOSED

Answer: C

Answer Explanation:

The loss of the Probe MUX Card will cause an indication of ?? on the Full Core Display. The PIP cables feed to the Probe MUX cards. The Probe MUX cards feed to the File Control processor which feed to the RCMS Controller card. The RCMS Controller then feeds the MCR Controller card which sends data to all RCMS Displays in the control room. When the data from the PIP cable is lost due to Probe MUX Card not responding it will cause the ??.

Data Fault will cause a text box telling you have lost data and the rod indication on the Full Core Display will be "XX."

If a rod has overtraveled there will be a text box stating Withdraw Error and the rod indication on the Full Core Display will be "OT."

If there were no position switches CLOSED the rod indication on the Full Core Display will be blank.

Reference: system description 047

Reference provided during examination: N/A

Cognitive level: memory

EXAMINATION ANSWER KEY

11-1 NRC RO Exam

Level (RO/SRO): RO

Tier: 2 **Group:** 2

K/A: 214000 Rod Position Information System

A3.01 Ability to monitor automatic operations of the ROD POSITION INFORMATION

SYSTEM including: Full core display

10 CFR Part 55 Content: 41.7

SRO Justification: N/A

Question Source: New

Question History: N/A

Comments:

Associated objective(s):

Given various plant conditions, predict the Rod Control Management System response to a loss of the major power supplies, RD system, or RL system while operating the system, or on an exam in accordance with station procedures.

Reference material intentionally withheld. Proprietary information returned to the facility licensee.

EXAMINATION ANSWER KEY

11-1 NRC RO Exam

48

ID: 295018AA1.02

Points: 1.00

Which of the following is directed to be monitored per LOA-WR-101, "Loss of Reactor Building Closed Cooling Water RBCCW" during reduced cooling capacity conditions in the RBCCW system?

- A. RR Pump seal cavity outlet temperature
- B. Offgas Refrigeration Machine glycol outlet temperature
- C. IN Compressor intercooler discharge temperature
- D. RWCU Pump Motor Cooler outlet temperature

Answer: A

Answer Explanation:

RR Pump seal cavity outlet temperature per LOA-WR-101 section B.1.5 specifically calls for monitoring of RR pump seal temperatures, and no other equipment is listed.

Offgas Refrigeration Machine, IN Compressor and RWCU Pump Motor cooler are all loads of RBCCW and would be required to be shutdown if you lost all RBCCW cooling.

Reference: LOA-WR-101

Reference provided during examination: N/A

Cognitive level: Memory

Level (RO/SRO):RO

Tier: 1 **Group:** 1

K/A: 295018, Partial or Total Loss of Component Cooling Water

AA1.02 - Ability to operate and/or monitor the following as they apply to PARTIAL OR COMPLETE LOSS OF COMPONENT COOLING WATER : System loads

10 CFR Part 55 Content: 41.7

SRO Justification: N/A

Question Source: Bank

Question History: N/A

Comments:

Associated objective(s):

Given a Service Water/chemical feed system lineup and various plant conditions, evaluate system indications/responses and determine in the indications/responses are expected and normal while operating the system, or on an exam in accordance with the student text.

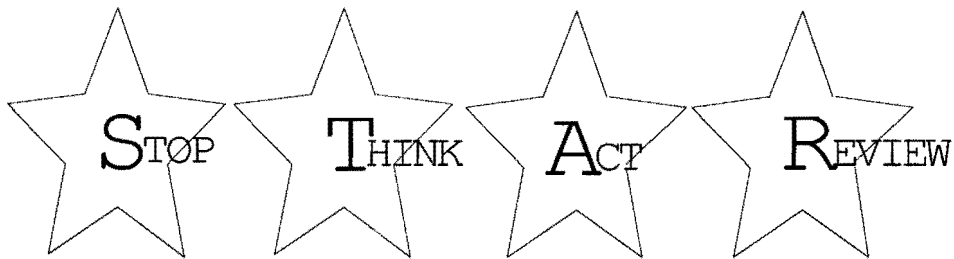
LaSalle Station

UNIT 1

OPERATING ABNORMAL PROCEDURE

LOSS OF REACTOR BUILDING CLOSED COOLING WATER (RBCCW)

LOA-WR-101
Revision 10
March 23, 2012



Procedure Responsibility/Review/Approval Requirements	
Responsible Department Head:	SOS
Minimum Review Type:	TR
Required Cross-Discipline Review(s):	N/A
Approval Position Required:	SOS
Specific Requirements:	
1. Review/Approval requirements apply to non-editorial procedure revisions.	

Level of Use
Continuous

LOSS OF REACTOR BUILDING CLOSED COOLING WATER
(RBCCW)

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Level of Use
Continuous

LOSS OF REACTOR BUILDING CLOSED COOLING WATER
(RBCCW)

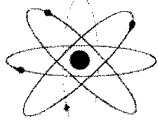
A. SYMPTOMS/ENTRY CONDITIONS

A.1 RBCCW System Reduced Cooling Capacity.

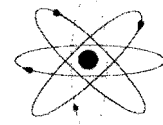
A.2 Alarms at panel 1PM10J:

- A101, Reactor Building Closed Cooling Water Pump Automatic Trip
- A201, Reactor Building Closed Cooling Water Pump Discharge Header Pressure Low
- A202, Reactor Building Closed Cooling Water Pump Suction Temperature Hi

Level of Use
Continuous



MANUAL SCRAMS



o Loss of RBCCW.

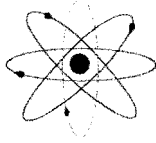
B. ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED

B.1 Reduced Cooling Capacity

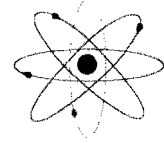
☞ Immediate Action

- | | | | |
|----|--|-----|--|
| 1. | CHECK RBCCW header discharge pressure - GREATER THAN 57 psig. | 1.1 | START standby RBCCW pump. <ul style="list-style-type: none"> • <u>If NO RBCCW pumps can be operated,</u>
EXIT to Section B.2. |
| 2. | CHECK Service water pressure - GREATER THAN 80 psig. | 2.1 | START standby Service Water pump (4 WS Pump Maximum). <ul style="list-style-type: none"> • <u>If Service Water pressure can NOT be maintained above 40 psig,</u>
EXIT to Section B.2. |
| 3. | MONITOR RBCCW discharge header temperature: <ul style="list-style-type: none"> • Temperature remains - LESS THAN 110°F. | 3.1 | COMMENCE an orderly unit shutdown per LGP-2-1, Normal Unit Shutdown. |

Level of Use
Continuous



MANUAL SCRAMS



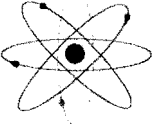
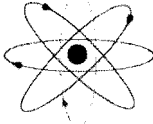
o Loss of RBCCW.

B. ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED

B.1 Reduced Cooling Capacity (continued)



- | | |
|--|---|
| <p>4. MONITOR Drywell for potential RBCCW leak – NO leak in DW.</p> <ul style="list-style-type: none"> • DWFDS inputs have NOT increased • DW temperature NOT increasing • DW pressure LESS THAN 1.69 # | <p>4.1 SM/US EVALUATE if unit operation can continue based on RBCCW leakage rate.</p> <p>4.2 <u>If</u> unit operation CANNOT continue.</p> <p>4.2.1 MANUALLY SCRAM reactor.</p> <p>4.2.2 PLACE RR Pmp breakers in PTL:</p> <ul style="list-style-type: none"> • 1A RR Pmp: <ul style="list-style-type: none"> • Bkr 1A • Bkr 2A • Bkr 3A • 1B RR Pmp: <ul style="list-style-type: none"> • Bkr 1B • Bkr 2B • Bkr 3B <p>4.2.3 ISOLATE RBCCW to DW by CLOSING:</p> <ul style="list-style-type: none"> • 1WR029 • 1WR040 • 1WR179 • 1WR180 <p>4.3 <u>If</u> RBCCW system parameters restored to normal, exit this procedure.</p> |
|--|---|

**Level of Use
Continuous**

	MANUAL SCRAMS	
o	Loss of RBCCW.	

B. ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED

B.1 Reduced Cooling Capacity (continued)

	CAUTIONS	
	<p>RR Pump Operation with Seal temperature(s) greater than 185°F may result in seal damage.</p> <p>RR Pump shutdown from rated temperature without seal purge will probably result in complete failure of a damaged seal.</p>	

5. MONITOR RR Pump 1A and 1B Seal Temperatures:

- Seal Temperatures remain - LESS THAN 185°F:
- (T₂) Seal Injection
- (T₃) No. 2 Seal Cavity Out

- If RR Pump Seal temperature(s) reach 200°F:
1. PLACE breakers for affected RR Pump(s) in PTL:
 2. ENTER LOA-RR-101 for RR Pump Trip.

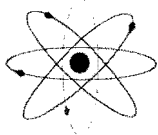
6. CHECK operating RBCCW heat exchanger(s) temperature controller setpoint(s) - 75°F to 90°F.

- 6.1 ADJUST operating temperature controller(s) to 75°F to 90°F:
- o 1TIC-WR032/33.
 - o 0TIC-WR007.

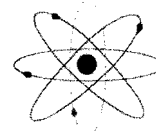
7. CHECK operating RBCCW heat exchanger(s) outlet temperature - 80 TO 95°F.

- 7.1 THROTTLE 1WS087A/B to maintain RBCCW outlet header temperature 80 to 95°F.
- o If Unit 0 RBCCW Hx is aligned to Unit 1, THROTTLE 1WS087C to maintain RBCCW outlet header temperature 80 to 95°F.

Level of Use Continuous
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MANUAL SCRAMS



o Loss of RBCCW.

B. ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED

B.1 Reduced Cooling Capacity (continued)

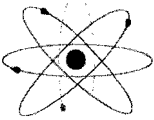
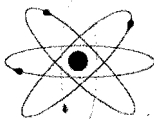
8. CHECK RBCCW discharge header temperature - LESS THAN 100°F.

8.1

If available, PLACE the off-line 1A/B RBCCW Heat Exchanger in parallel operation:



1. OPEN 1WS085A/B, WS to RBCCW Hx 1A/B Inlet Stop.
2. OPEN 1WS088A/B, WS From RBCCW Hx 1A/B FCV Downstream Stop.
3. OPEN 1WS086A/B, WS From RBCCW Hx 1A FCV Upstream Stop.
4. VERIFY 1TIC-WR032/33 set to 75°F to 90°F.
5. OPEN 1WR041A/B, 1A/B RBCCW Heat Exchanger RBCCW Inlet Stop.
6. OPEN 1WR042A/B, 1A/B RBCCW Heat Exchanger RBCCW Outlet Stop.

Level of Use
Continuous

	MANUAL SCRAMS	
o	Loss of RBCCW.	

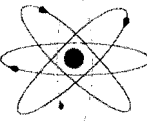
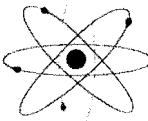
B. ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED

B.1 Reduced Cooling Capacity (continued)

	CAUTION	
	To prevent loss of RBCCW, the Unit 0 RBCCW Heat Exchanger must <u>NOT</u> be simultaneously aligned to both Units.	

- 8.2 If 1A/B RBCCW Hx is NOT available and 0 RBCCW Hx is available to Unit 1, PLACE 0 RBCCW Heat Exchanger in parallel operation:
1. VERIFY 0 RBCCW Hx is NOT required operating for Unit 2.
 2. OPEN 1WS085C, WS to 0 RBCCW Hx Inlet Stop.
 3. OPEN 1WS086C, WS From 0 RBCCW Hx Upstream Stop.
 4. OPEN 1WS088C, WS From 0 RBCCW Hx Downstream Stop.
 5. VERIFY Temperature Controller 0TIC-WR007 set at 75°F to 90°F.

Level of Use Continuous

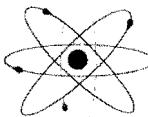
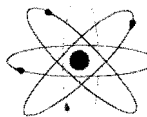
	MANUAL SCRAMS	
o	Loss of RBCCW.	

B. ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED

B.1 Reduced Cooling Capacity (continued)



- | | |
|---|---|
| <p>9. CHECK RBCCW discharge header temperature – LESS THAN 105° F.</p> | <p>6. CLOSE 2WR042C, Cross-Tie From RBCCW Hx 0A to Unit 2 Stop.</p> <p>7. CLOSE 2WR041C, U2 Cross-Tie to RBCCW Hx 0A Stop.</p> <p>8. OPEN 1WR041C, 0 RBCCW Heat Exchanger RBCCW Inlet Stop.</p> <p>9. OPEN 1WR042C, 0 RBCCW Heat Exchanger Outlet Stop.</p> |
| <p>9.1</p> | <p>9.1 CONSIDER shutting down RWCU system per LOP-RT-03 to reduce heat load on the WR system.</p> |

Level of Use Continuous
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	MANUAL SCRAMS	
o	Loss of RBCCW.	

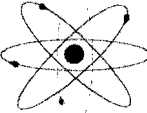
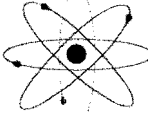
B. ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED

B.2 Loss of RBCCW System

	CAUTION	
	WR cooling is lost to both RR pumps and other plant equipment.	

1. MANUALLY SCRAM reactor.
2. PLACE RR Pmp breakers in PTL:
 - 1A RR Pmp:
 - Bkr 1A
 - Bkr 2A
 - Bkr 3A
 - 1B RR Pmp:
 - Bkr 1B
 - Bkr 2B
 - Bkr 3B
3. STOP running RWCU Pump(s):
 - o 1A RWCU Pmp
 - o 1B RWCU Pmp
4. MONITOR for Reactor Vessel stratification per LOA-RR-101 while continuing here.

Level of Use Continuous
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	MANUAL SCRAMS	
o	Loss of RBCCW.	

B. ACTION/EXPECTED RESPONSE RESPONSE NOT OBTAINED

B.2 Loss of RBCCW System (continued)

5. SHUTDOWN RBCCW loads:

- o RWCU System per LOP-RT-03.
- o Off Gas Refrigeration machines 1A/B per LOP-OG-05.
- o Off Gas Building HVAC per LOP-VO-02.
- o Reactor Building Instrument Storage Room Air Conditioner.
- o Drywell Pneumatic Compressors per LOP-IN-102.
- o CRD Feed pumps per LOP-RD-05.

Level of Use Continuous

C. DISCUSSION

- C.1 Procedure is written to address reduced cooling capacity and loss of the system.
- C.2 Reduced cooling capacity section directs the user to exit to Section B.2, (loss of RBCCW) in the event no RBCCW pumps can be started, Service Water pressure can NOT be improved or RBCCW system temperature has risen to 110°F (FSAR 9.2.3.2). Otherwise:
- C.2.1 The Drywell temperature, pressure and Unidentified Leakage are monitored for indications of an RBCCW leak inside the Drywell. These parameters are suggested for monitoring because 1) the increased DWFDS inputs identify water leakage, 2) the low DW pressure and temperature indicate that the water is from a cold water source and not from condensed steam, and 3) stable DW temperature also indicates that VP is probably NOT the source of the water. Obviously, the Control Room team should use all available indications. If the Control Room team identifies that the RBCCW degradation is due to an RBCCW leak in the Drywell and unit operation cannot continue based on size of the leak, the Reactor is scrammed, the RR pumps are shutdown and RBCCW is isolated to the Drywell. This action is intended to restore RBCCW cooling capacity to maintain cooling to other plant loads.
- C.2.2 RR Pump Seal temperatures are monitored.
- C.2.2.1 If seal temperatures are at or above 185° F, the pump seal faces are probably being damaged and a shutdown of the pump should be commenced within 72 hours. If the CRD seal purge flow entering the seal (T2) or seal staging outflow (T3) reach 200° F, then seal failure is imminent and the pump must be shutdown. (Ref. EC 339538)
- C.2.3 The RBCCW system Temperature control valve setpoint is checked/adjusted as necessary.
- C.2.4 Additional system heat exchangers are placed in service as necessary.
- C.3 The loss of RBCCW section is written assuming that actions of supporting annunciator procedures have already been taken, (pump trip, expansion tank level, etc.). A complete loss of the RBCCW system requires immediate action to minimize damage to plant components. The most limiting concern is the Recirculation Pump Motor Windings.

C.4 Personnel are directed to consider the shutdown of the Reactor Water Cleanup (RWCU) System if the heat load on the RBCCW system cannot be controlled below 105° F. The RWCU system is the primary heat load for the RBCCW system and temporarily removing this heat load will gain time for personnel to take additional compensatory actions to regain temperature control prior to the system reaching its 110° F design limit. LOP-RT-03 for removing RWCU contains actions for the Chemistry Department to monitor reactor water chemistry while the system is shutdown.

C.5 The following systems are affected by loss of RBCCW:

- Reactor Bldg Drain Tank Heat Exchanger, 1RE01A.
- Off Gas Refrigeration Machines 1A/B.
- Off Gas Bldg HVAC A/C Unit A.
- Reactor Bldg Inst Storage Room HVAC A/C 1VR01S.
- Reactor Recirc Pump 1A/B Seal, Bearing and Motor Coolers.
- Reactor Bldg Process Sample Cooler Pnl 1PL14J.
- Drywell Penetration Cooling Coils.
- Drywell Equip Drn Sump Heat Exchanger 1RE02A.
- CRD Feed Pumps 1A/B.
- RWCU Non-Regen Heat Exchangers 1A/B.
- RWCU Recirc Pumps 1A/B.
- Drywell Pneumatic Compressors 1IN02CA, 1IN02CB.
- Drywell Pneumatic Compressor Aftercoolers 1IN16AA, 1IN16AB.
- Drywell Sump Sample Pump 1RE14P.

Level of Use
Continuous

EXAMINATION ANSWER KEY

11-1 NRC RO Exam

60

ID: 500000EK2.01

Points: 1.00

With Unit 2 at rated power, a large LOCA occurred in which fuel became temporarily uncovered.

LGA-001 and LGA-003 have been entered.

20 Minutes after operators started the Post-LOCA H₂/O₂ monitoring system, the following readings are taken:

- Drywell O₂ concentration is 0.5% by volume and stable.
 - Drywell H₂ concentration is 1% by volume and rising slowly.
- 1) Would these Post-LOCA H₂/O₂ monitoring system readings be RELIABLE or would they still NEED MORE TIME to warm up and stabilize?
 - 2) Based solely on the H₂/O₂ content, for these post-LOCA conditions, would operation of the H₂ Recombiners per LGA-HG-101 be DESIRABLE or NOT DESIRABLE?
 - A. 1) RELIABLE
2) NOT DESIRABLE
 - B. 1) RELIABLE
2) DESIRABLE
 - C. 1) NEED MORE TIME
2) DESIRABLE
 - D. 1) NEED MORE TIME
2) NOT DESIRABLE

Answer: B

Answer Explanation:

Per LGP 2-1, Drywell de-inerting can begin while at power, making it plausible to have elevated O₂ levels. Post-LOCA H₂/O₂ monitoring system is started as part of LGA-003. Per LOP-CM-02, these analyzers take 15 minutes to warm up and stabilize. After 20 minutes these readings would be RELIABLE. When hydrogen is detected (0.5% is minimum detectable) then LGA-011 Hydrogen Control is entered. The 1st step is to place H₂ recombiners in service as a mixing system per LGA-HG-201. They would not be shutdown unless H₂ concentrations exceed 5% at the given O₂ level, so their operation is DESIRABLE.

RELIABLE, NOT DESIRABLE: Selected if the candidate does not recognize 1) that the Lower Explosive Limit of Hydrogen is 4%, 2) that the LGA-011 breakpoint for recombiner shutdown is 5%, or 3) that LGA-HG-101 does not include recombiner operation with the electric heaters (i.e.: the recombiner) in service.

NEED MORE TIME, DESIRABLE: Any time over 20 minutes is plausible if the 15-minute warmup time is not known.

NEED MORE TIME, NOT DESIRABLE: A combination of Distractor 1 & 2 explanations. Also selected if the candidate thinks the analyzers NEED MORE TIME because, per LGA-HG-101, unknown readings are interpreted as high readings, which would require H₂ Recombiner shutdown.

EXAMINATION ANSWER KEY

11-1 NRC RO Exam

Reference: LGA-011, LGA-HG-201, LOP-CM-02
Reference provided during examination: N/A

Cognitive level: High

Level (RO/SRO):RO
Tier: 1 **Group:** 2

K/A: 500000 High Containment Hydrogen Concentration
EK2.01 Knowledge of the interrelations between **HIGH CONTAINMENT HYDROGEN CONCENTRATIONS** the following: Containment hydrogen monitoring systems
10 CFR Part 55 Content:41.7
SRO Justification: N/A

Question Source: New
Question History:N/A

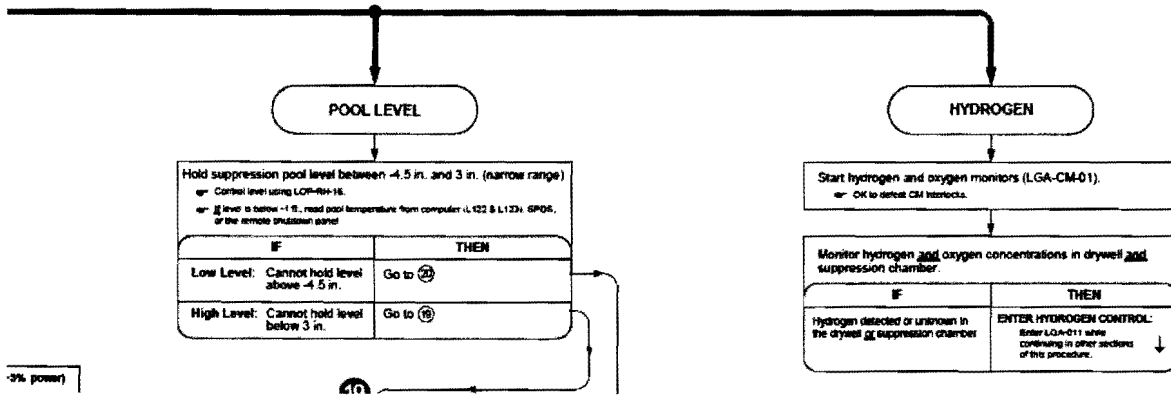
Comments:

Associated objective(s):

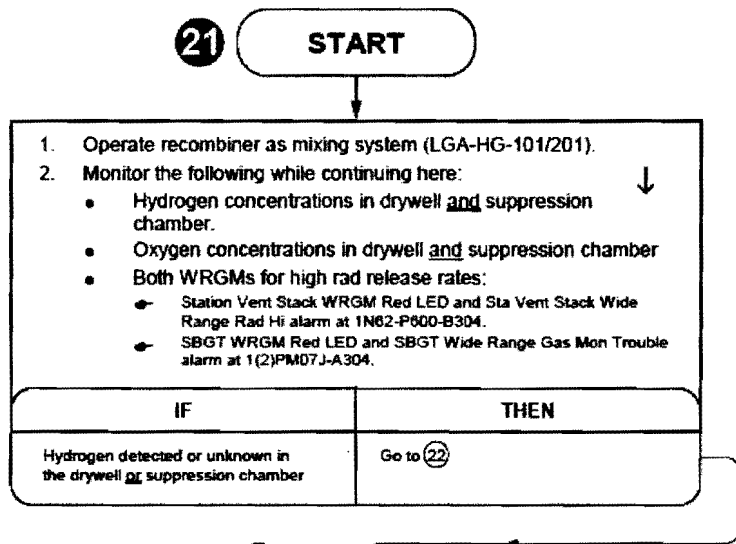
Given LGA-003, Primary Containment Control, in progress, mitigate the consequences of detectable or unknown Hydrogen concentration in the Suppression Chamber or Drywell, while operating the plant or on an exam, IAW LGA-003.

ENT CONTROL

Drywell or suppression chamber hydrogen above 2%



LGA-011 HYDROGEN CONTROL



Content/Skills

Parallel execution is also required because the symptomatic approach to emergency response precludes the prioritization of any one action path since independence from initiating events and transients must be maintained.

While this procedure is structured along five parallel paths, performing actions simultaneously is most times not possible mainly because there are only so many people at your command. Therefore you must prioritize your actions to the degree you have manpower but this prioritization should not force you to tunnel in on one particular path at the expense of checking other paths. Generally, your first actions should be along the path of the specific entry condition(s) that caused you to enter LGA-003. Since many paths have you ultimately depressurize or ADS, suppression pool cooling should be started as soon as possible. Once pool cooling is started and you are carrying out actions for the entry conditions of concern, scan across the flowchart to ensure other paths are under control.

Objective 769.00.01

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EXAMINATION ANSWER KEY

11-1 NRC RO Exam

74

ID: **GENERIC 2.3.13**

Points: 1.00

Unit 1 is at rated conditions with TIP traces in progress.

TIP area is posted and verified clear.

- 'B' TIP has just completed a trace and has been returned to the shield.
- 'A' TIP is at position 0001.

The 1H13-P601-B211, RB TIP ROOM RAD HI/DOWNSCALE, has come in and is verified to be HI.

Which of the following is the NEXT expected action(s) for the operator running the TIP trace?

- A. close the 'A' TIP ball valve ONLY
- B. continue with the next TIP trace
- C. close the 'A' TIP ball valve and shutdown the TIP machine
- D. withdraw the 'A' TIP to the in-shield position and then close the 'A' TIP ball valve

Answer: B

Answer Explanation:

The TIP room HIGH Rad alarm is a normal occurrence while operating TIPs. So therefore the operator should continue performing TIP traces. If one were to assume this was an abnormal condition you would withdraw the TIPs to the in-shield position and close the ball valve. Per LOP-NR-06 you are to return the remaining TIPS not just 'A' TIP, so therefore closing the TIP ball valve only is incorrect. Shutdown the TIP machine would normally be done after one withdraws the TIPs but in this case the operator is to continue on with the next TIP trace.

Reference: LOR-1H13-P601-B211, LOP-NR-06

Reference provided during examination: N/A

Cognitive level: memory

Level (RO/SRO): RO

Tier: 3 **Group:** N/A

K/A: 2.3.13 Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.

10 CFR Part 55 Content:41.12

SRO Justification: N/A

Question Source: New

Question History:

Comments:

Description: Reactor Building TIP Room Radiation High or Downscale
Computer Print: NA008 (No Printout)
Setpoint: HI – Per LRP-5800-3 as documented on Attachment A of last LIP-AR-501A performed. Downscale
Sensor No: 1D21-N003D
Alarm No: 1AR09A
Drawing: 1E-1-4219AA
Activating Device: 1D21-K602D-K2



A. AUTOMATIC ACTIONS

1. Local Audible Alarm on Hi Rad.

B. OPERATOR ACTIONS

1. CHECK Rx Building TIP Room ARM on Panel 1D21-P600 to determine radiation level.
2. **If radiation level is high due to operation of TIP System:**
 - a. VERIFY TIP Room is evacuated.
 - b. REFER to LOA-AR-101, Unit 1 Area Radiation Monitoring System Abnormal.
 - c. MONITOR TIP Room dose rates until detector decays below alarm setpoint.
3. **If radiation level is high due to unknown reasons:**
 - a. EVACUATE TIP Room.
 - b. DIRECT Radiation Protection to check validity of alarm to determine its source if possible.
 - c. CHECK fuse on right-hand side on back of indicator and trip unit at 1D21-P600, if indicator is pegged high.
 - d. CHECK if 120 VAC MCC 136Y-2 Ckt.#19 has been turned off.

Level of Use
Continuous

- e. REFER to LOA-AR-101, Unit 1 Area Radiation Monitoring System Abnormal.
4. If radiation level is downscale:
- a. CHECK associated power supply is ON.
 - b. DEPRESS RESET Pushbutton.
 - c. If monitor is still downscale:
 - 1) NOTIFY Unit Supervisor.
 - 2) NOTIFY Radiation Protection Supervisor.
 - 3) CHECK fuse on left-hand side on back of indicator and trip unit at 1D21-P600, if indicator is pegged downscale.
 - 4) CHECK if detector has been disconnected.
 - 5) INITIATE Action Request to have monitor repaired.

Question #174

B. ACTION/EXPECTED RESPONSE

RESPONSE NOT OBTAINED

B.1 Area High Radiation

1. NOTIFY/EVACUATE personnel from affected area.

2. RESTRICT access to affected area.

RP 3. SURVEY and SAMPLE affected area.

4. REFER to LGA-002, Secondary Containment Control.

SM 5. REVIEW EALs and IMPLEMENT Emergency Plan as appropriate.

6. CHECK cause of high radiation - 6.1 DETERMINED.

DETERMINE cause of high radiation.

- o CHECK radiation monitors for abnormal readings.
- o CHECK stack gas release rate.
- o CHECK Off-Gas System release rate and flow.
- o CHECK area temperatures and Leak Detection System temperatures.
- o CHECK continuous air monitors.

6.2 If radiation levels permit, CHECK affected areas for visible shielding. EO

Level of Use
Continuous

Question #174

<u>ACTION/EXPECTED RESPONSE</u>		<u>RESPONSE NOT OBTAINED</u>	
B.1	<u>Area High Radiation (continued)</u>		
7.	CHECK cause of high radiation - STOPPED.	7.1	ISOLATE leak or SHUTDOWN affected system.
8.	CHECK Controlled Area - ESTABLISHED.	8.1	ESTABLISH a Controlled Area. RP^o
9.	CHECK exposure of any personnel in affected area - DETERMINED.	9.1	READ dosimeters/TLD of personnel who may have been exposed. RP^o

Level of Use
Continuous

Question #74

E.6 Inadvertent Retraction of TIP Beyond Shield

E.6.1 If a TIP does inadvertently retract beyond shield, and TIP DRIVE PRM K601E reaches upscale value, PERFORM following:

E.6.1.1 REFER TO LOA-AR-101(201).

E.6.1.2 REQUEST Rad Protection to confirm that personnel have been evacuated from TIP area and radiation levels at established boundaries and floor of 761' above do NOT exceed 40R/hr.

E.6.1.3 RETURN remaining TIPs to IN-Shield position.

E.6.1.4 CHECK all TIP ball valves close and VALVE OPEN lights on Drive Control Units go dim.

E.6.1.5 CHECK there are no indications of primary system leakage into Secondary Containment.