#### T-75 day Outline Submittal Comments

Written Exam Outline

Q 76, 77, 78 & Q81 - K/A not SRO level topic

Q 9 - Pretty basic system knowledge

Q 80 - borderline RO level knowledge

Q 85 - Rad exposure limits GET level except under emergency conditions

Q88 - verify alarms sounds like RO level topic

Q39 &41 testing CCS seems like a lot of questions on this system

Q 47 & 51 – could be SRO level topic depends on Q asked.

Q 53 - too simple

Q 59 - maintenance of spent fuel pool may be too simplistic

Q92 – looks like RO topic

General comment alarm response extensively tested on operating test

Q 68 – industrial safety important but not license level topic

Q 94 & 95 not SRO level topics

Q69 – knowledge of process for conducting special tests – appears more like an open reference requal topic.

Q 96 – ok if evaluating TS or risk

Q71 – ability to use rad monitoring equip – GET level

Q98 – ok for EOP condition

Q99 – already tested fire protection procedure on earlier Q.

No comments on Operating Test Outlines



Entergy Nuclear Northeast Entergy Nuclear Operations, Inc. IPEC Training P.O. Box 308 Buchanan, NY 10511 914-788-2604

April 9, 2010 Indian Point Unit No. 2 Docket No. 50-247 NL- 10-039 IP-TNG-10-01

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

Subject: Indian Point Unit 2 Initial Licensed Operator Examination Outline

Dear Mr. Collins,

In preparation for the Indian Point Unit 2 Reactor Operator and Senior Reactor Operator initial licensing examinations, scheduled to start on July 12, 2010, Entergy Nuclear Operations, Inc. (Entergy) is providing the enclosed Reactor Operator and Senior Reactor Operator Written Examination Outlines to Mr. John Caruso of your staff. The examination outlines are being provided in accordance with the instructions of NUREG-1021, "Operator Licensing Examination Standards for Nuclear Power Reactors," Rev 9.

In accordance with 10 CFR 55.49 and the Examination Security and Integrity Considerations in Examiner Standard ES-201, Attachment 1, the attached materials should be withheld from public disclosure until after the examinations are complete.

Entergy is making no commitments in this letter. Should you have any questions regarding this matter, please contact Mr. Stephen Davis, Superintendent, ILO Operations Training at (914) 788-2904, Mr. Arthur Singer, Superintendent, LRQ Operations Training, at (914) 788-2942, Mr. Tim Jenkins, Senior Instructor Examination author at (914) 788-2630, or Mr. Charlie Kocsis, Senior Instructor Examination author at (914) 788-2065.

Sincerely ons John Ferrick

John Ferrick Manager, Training and Development Judian Point Energy Center

Signed per NUREG 1021, ES-201, C.1.g

Arthur Singer, Facility Representative

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2010

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Docket No. 50-247 NL- 10-039 Page 2 of 2

Enclosures: Certification of systematic and random selection NUREG-1021, Rev. 9, Form ES-201-2, "Examination Outline Quality Checklist" NUREG-1021, Rev. 9, Form ES-301-1, "RO Administrative Topics Outline" NUREG-1021, Rev. 9, Form ES-301-1, "SRO Administrative Topics Outline" NUREG-1021, Rev. 9, Form ES-301-2, "RO Control Room/In-Plant Systems Outline" NUREG-1021, Rev. 9, Form ES-301-2, "SRO-I Control Room/In-Plant Systems Outline" NUREG-1021, Rev. 9, Form ES-301-5, "Transient and Event Checklist" NUREG-1021, Rev. 9, Form ES-D-1, "Scenario 1 Outline" NUREG-1021, Rev. 9, Form ES-D-1, "Scenario 2 Outline" NUREG-1021, Rev. 9, Form ES-D-1, "Scenario 3 Outline" NUREG-1021, Rev. 9, Form ES-D-1, "Scenario 4 Outline" NUREG-1021, Rev. 9, Form ES-D-1, "Scenario 5 Outline" NUREG-1021, Rev. 9, Form ES-401-2, "PWR Examination Outline" - RO/SRO NUREG-1021, Rev. 9, Form ES-401-3, "Generic Knowledge and Abilities Outline" - RO/SRO NUREG-1021, Rev. 9, Form ES-401-4, "Record of Rejected K/As" - RO/SRO

CC:

Document Control Desk U.S. Nuclear Regulatory Commission Mail Stop O-P1-17 Washington, DC 20555-0001	w/o Enclosures
Mr. Samuel Hansell Jr. Chief, Operational Safety Branch Division of Reactor Safety Region I U.S. Nuclear Regulatory Commission 475 Allendale Road King of Prussia, Pennsylvania 19406-1415	w/o Enclosures
Mr. John Caruso	with Enclosures
Chief Examiner Region I U.S. Nuclear Regulatory Commission 475 Allendale Road King of Prussia, Pennsylvania 19406-1415	

## Description of program used to generate IPEC Unit 2 July 2010 Written Exam K/As

Generated the RO and SRO sample plan using the "NKEG" Database Program, version 1.1, developed by Westinghouse Electric Company. This program will automatically produce a Random Sample Plan based on NUREG 1122, Rev. 2, Supplement 1 K/As.

K/As were suppressed prior to the outline generation process as provided for in the examiner standard, the list of suppressed K/As is provided as required by the examiners standard.

Inappropriate and inapplicable K/As were discarded during the outline development process and are included in the record of rejected K/As. The replacement K/As were replaced using the random sample function of the NKEG database program.

#### ES-401

#### PWR Examination Outline

Date Of Exam:

#### Indian Point Unit 2 Facility:

		_																
				RO	K/A	Ca	iteg	ory	Poir			SR	O-Or	nly Po	ints			
Tier	Group	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G*	Total		A2		G*	Total
1.	1	3	3	3				3	3			3	18		3		3	3
Emergency &	2	1	2	1		N/A		1	2	N	/A	2	9		2		2	4
Abnormal Plant Evolutions	Tier Totals	4	5	4				4	5		_	5	27		5		5	10
2.	1	3	2	3	3	3	2	3	3	2	2	2	28		3		2	5
Plant	2	1	1	1	1	1	1	1	1	1	1	0	10	0		2	1	3
Systems	Tier Totals	4	3	4	4	4	3	4	4	3	3	2	38		5		3	8
3. Gene	ric Knov	vledg	je Ar	nd	1	1	2	2	3	3		1	10	1	2	3	4	7
	ities Cat				,	2		3		3		2	10	2	2	1	2	7

07/12/2010

Note:

Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO 1. and SRO-only outlines (i.e., except for one category in Tier 3 of the SRO-only outline, the "Tier Totals" in each K/A category shall not be less than two).

- 2. The point total for each group and tier in the proposed outline must match that specified in the table. The final point total for each group and tier may deviate by ±1 from that specified in the table based on NRC revisions. The final RO exam must total 75 points and the SRO-only exam must total 25 points.
- Systems/evolutions within each group are identified on the associated outline; systems or evolutions that 3. do not apply at the facility should be deleted and justified; operationally important, site-specific systems/evolutions that are not included on the outline should be added. Refer to Section D.1.b of ES-401 for guidance regarding the elimination of inappropriate K/A statements.
- Select topics from as many systems and evolutions as possible; sample every system or evolution 4. in the group before selecting a second topic for any system or evolution.
- 5. Absent a plant-specific priority, only those K/As having an importance rating (IR) of 2.5 or higher shall be selected. Use the RO and SRO ratings for the RO and SRO-only portions, respectively.
- Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories. 6
- 7.\* The generic (G) K/As in Tiers 1 and 2 shall be selected from Section 2 of the K/A Catalog, but the topics must be relevant to the applicable evolution or system. Refer to Section D.1.b of ES-401 for the applicable K/As.
- On the following pages, enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IRs) for the applicable license level, and the point totals (#) for each system and category. Enter the group and tier totals for each category in the table above; if fuel handling equipment is sampled in other than Category A2 or G\* on the SRO-only exam, enter it on the left side of Column A2 for Tier 2, Group 2 (Note #1 does not apply). Use duplicate pages for RO and SRO-only exams.
- For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, 9. IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

Printed: 03/16/2010

Facility: Indian Pont Unit 2		PW	/R	RO/S	RO	Exam	iion Out	tline		
Facinty: Indian Font Onit 2		N	RC	Writ	ten ]	Exami	nation Outl	line		
ES-401 Er	nerge	ncy and	Ał	onorm	nal F	Plant <b>E</b>	volutions -	Tier 1 / Group 1 F	orm ES-	401-2
E/APE # / Name / Safety Function	K1	K2 F	3	A1	A2	G	Number	К/А Торіс	Imp.	<b>Q</b> #
000007 Reactor Trip - Stabilization - Recovery / 1	X						EK1.02	Knowledge of the operational implications of the following concepts as they apply to the reactor trip: - Shutdowr margin		1
000008 Pressurizer Vapor Space Accident / 3					X		AA2.13	Ability to determine and interpret the following as they apply to the Pressurize Vapor Space Accident: - High-pressure safety injection pump flow indicator, ammeter, and controller	r 3.9	76
000009 Small Break LOCA / 3						X	2.1.25	Conduct of Operations - Ability to interpret reference materials such as graphs, curves, tables etc.	4.2	81
000011 Large Break LOCA / 3						X	2.4.8	Emergency Procedures/Plan - Knowledge of how abnormal operating procedures ar used in conjunction with EOPs.		77
000011 Large Break LOCA / 3					X		EA2.13	Ability to determine and interpret the following as they apply to a Large Break LOCA: - Difference between overcooling and LOCA indications		78
000015/000017 RCP Malfunctions / 4						X	2.1.29	Equipment Control - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	3.1	3
000025 Loss of RHR System / 4							AK3.01	Knowledge of the reasons for the following responses as they apply to the Loss of Residual Heat Removal System: Shift to alternate flowpath	3.1	2
000026 Loss of Component Cooling Water / 8		>	ζ		「生活」と		AK3.02	Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: - The automatic actions (alignments) within the CCWS resulting from the actuation of the ESFAS		4

		]	PWR	RO/S	SRO E	xami	hon Out	line		
Facility: Indian Pont Unit 2			MDC	<b>TT</b> 7*4		<b>.</b>		•		
ES-401 E	merge						nation Outl		orm ES-	401-2
E/APE # / Name / Safety Function		K2					Number	K/A Topic	Imp.	
¥										
000027 Pressurizer Pressure Control System Malfunction / 3					X		AA2.15	Ability to determine and interpret the following as they apply to the Pressurize Pressure Control Malfunctions: - Actions to be taken if PZR pressure instrument fails high		5
000029 ATWS / 1		X					EK2.06	Knowledge of the interrelations between the ATWS and the following: - Breakers relays, and disconnects		6
000038 Steam Gen. Tube Rupture / 3							EA2.01	Ability to determine and interpret the following as they apply to a SGTR: - When to isolate one or more S/Gs	4.1	7
000040 Steam Line Rupture - Excessive Heat Transfer / 4					X		AA2.02	Ability to determine and interpret the following as they apply to the Steam Lin Rupture: - Conditions requiring a reactor trip		79
000054 Loss of Main Feedwater / 4				X			AA1.02	Ability to operate and/or monitor the following as they apply to the Loss of Main Feedwater (MFW): - Manual startu of electric and steam-driven AFW pumps		8
000055 Station Blackout / 6					X		EA2.01	Ability to determine and interpret the following as they apply to a Station Blackout: - Existing valve positioning on a loss of instrument air system	3.4	9
000056 Loss of Off-site Power / 6	X						AK1.04	Knowledge of the operational implications of the following concepts as they apply to Loss of Offsite Power: - Definition of saturation conditions, implication for the systems	3.1	10
000057 Loss of Vital AC Inst. Bus / 6				X			AA1.04	Ability to operate and/or monitor the following as they apply to the Loss of Vital AC Instrument Bus: - RWST and VCT valves	3.5	11

		]	PWR	RO/S	SRO E	xami	on Out	line		
Facility: Indian Pont Unit 2			NRC	Writ	ten Fy	vamii	nation Outl	ine		
ES-401 E	merge								Form ES-	401-2
E/APE # / Name / Safety Function	K1	K2			A2		Number	K/A Topic	Imp.	<b>Q</b> #
000058 Loss of DC Power / 6						X	2.2.36	Equipment Control - Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.		12
000058 Loss of DC Power / 6						X	2.4.46	Emergency Procedures/Plan - Ability to verify that the alarms are consistent with the plant conditions.		80
000062 Loss of Nuclear Svc Water / 4						X	2.2.42	Equipment Control - Ability to recogniz system parameters that are entry level conditions for Technical Specifications.		13
000077 Generator Voltage and Electric Grid Disturbances / 6	X						AK1.03	Knowledge of the operational implications of the following concepts a they apply to Generator Voltage and Electric Grid Disturbances: - Under- excitation	s 3.3	14
W/E04 LOCA Outside Containment / 3			X				EK3.2	Knowledge of the reasons for the following responses as they apply to the LOCA Outside Containment: - Normal, abnormal and emergency operating procedures associated with LOCA Outside Containment	3.4	15
W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4		X					EK2.1	Knowledge of the interrelations between the Loss of Secondary Heat Sink and the following: - Components, and functions of control and safety systems, including instrumentation, signals, interlocks, failure modes, and automatic and manual features		16
W/E11 Loss of Emergency Coolant Recirc. / 4				X				Ability to operate and/or monitor the following as they apply to the Loss of Emergency Coolant Recirculation: - Components, and functions of control ar safety systems, including instrumentatio signals, interlocks, failure modes, and automatic and manual features		17

		]	PWR	RO/S	SRO E	Ixami	on Out	line		
Facility: Indian Pont Unit 2										
			NRC	Writ	ten E	xamir	ation Outli	ine		
ES-401 En	nerge	ncy a	nd Ab	norr	nal Pl	ant E	volutions -	Tier 1 / Group 1 For	m ES-4	401-2
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	Number	K/A Topic	Imp.	<b>Q</b> #
W/E12 - Steam Line Rupture - Excessive		X					EK2.2	Knowledge of the interrelations between	3.6	18
Heat Transfer / 4		1						the Uncontrolled Depressurization of all		
								Steam Generators and the following: -		
								Facility's heat removal systems, including		
		1						primary coolant, emergency coolant, the		
						in the		decay heat removal systems, and relations	1	
								between the proper operation of these		
					4			systems to the operation of the facility		

Facility: Indian Pont Unit 2

## PWR RO/SRO Examin....on Outline

			NRC	Writ	ten Ex	xamir	nation Outli	ine	
ES-401 E	merge	ncy a	nd Ab	norn	ial Pla	ant E	volutions - 7	Fier 1 / Group 2	Form ES-401-2
E/APE # / Name / Safety Function	<b>K</b> 1	<b>K2</b>	K3	A1	A2	G	Number	K/A Topic	Imp. Q#

000001 Continuous Rod Withdrawal / 1			AA2.01	Ability to determine and interpret the following as they apply to the Continuous Rod Withdrawal: - Reactor tripped breaker indicator	4.2	19
000003 Dropped Control Rod / 1			2.4.31	Emergency Procedures/Plan - Knowledge of annunciators alarms, indications, or response instructions.	4.2	23
000003 Dropped Control Rod / 1			X 2.2.22	Equipment Control - Knowledge of limiting conditions for operations and safety limits.	4.7	82
000028 Pressurizer Level Malfunction / 2			2.2.25	Equipment Control - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	3.2	24
000032 Loss of Source Range NI / 7			AA2.03	Ability to determine and interpret the following as they apply to the Loss of Source Range Nuclear Instrumentation: - Expected values of source range indication when high voltage is automatically removed	2.8	20
000033 Loss of Intermediate Range NI / 7		>	AA1.03	Ability to operate and/or monitor the following as they apply to the Loss of Intermediate Range Nuclear Instrumentation: - Manual restoration of power	3.0	21
000024 Emergency Boration / 1			AA2.02	Ability to determine and interpret the following as they apply to the Emergency Boration: - When use of manual boration valve is needed	4.4	83
000036 Fuel Handling Accident / 8	X		AK1.02	Knowledge of the operational implications of the following concepts as they apply to Fuel Handling Incidents: - SDM	3.4	22

Facility: Indian Pont Unit 2		ł	WR	KO/S	SKU E	xami	on Out	line		
Facinity: Indian Font Onit 2			NRC	Writ	ten Ex	kamir	ation Outl	ine		
ES-401 E	merge	ncy al	nd At	onorn	nal Pla	ant E	volutions -	Tier 1 / Group 2 Fo	rm ES-4	401-2
E/APE # / Name / Safety Function	<b>K</b> 1	K2	K3	A1	A2	G	Number	K/A Topic	Imp.	<b>Q</b> #
000037 Steam Generator Tube Leak / 3					X		AA2.02	Ability to determine and interpret the following as they apply to the Steam Generator Tube Leak: - Agreement/disagreement among redundant radiation monitors	3.9	84
W/E03 LOCA Cooldown - Depress. / 4		Х					EK2.1	Knowledge of the interrelations between the LOCA Cooldown and Depressurization and the following: - Components, and functions of control and safety systems, including instrumentation signals, interlocks, failure modes, and automatic and manual features		25
W/E06 Inad. Core Cooling / 4		Х					EK2.2	Knowledge of the interrelations between the Degraded Core Cooling and the following: - Facility's heat removal systems, including primary coolant, emergency coolant, the decay heat removal systems, and relations between the proper operation of these systems to the operation of the facility	3.8	26
W/E08 RCS Overcooling - PTS / 4			X				EK3.1	Knowledge of the reasons for the following responses as they apply to the Pressurized Thermal Shock: - Facility operating characteristics during transient conditions, including coolant chemistry and the effects of temperature, pressure, and reactivity changes and operating limitations and reasons for these operating characteristics	3.4 g	27
W/E13 Steam Generator Over-pressure / 4						X	2.3.4	Radiological Controls - Knowledge of radiation exposure limits under normal and emergency conditions.	3.7	85

Facility: Indian Pont Un	it 2					]	PWR	RO/S	SRO	Exar	at	ion Outlin	le			
							NRC	C Wri	tten l	Exam	inati	on Outline	e			
ES-401						P	lant	Syste	<b>ns -</b> [	Fier 2	2 / Gr	oup 1		Fo	rm ES-401	1-2
System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	Number	K/A Topic		Imp	Q#

003 Reactor Coolant Pump	X						K1.12	Knowledge of the physical connections and/or cause-effect relationships between the RCPS and the following systems: - CCWS	3.0	28
004 Chemical and Volume Control		X					K5.07	Knowledge of the operational implications of the following concepts as they apply to the CVCS: - Relationship between SUR and reactivity	2.8	29
004 Chemical and Volume Control				×			A2.13	Ability to (a) predict the impacts of the following malfunctions or operations on the CVCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Low RWST	3.9	86
005 Residual Heat Removal			x				A1.05	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the RHRS controls including: - Detection of and response to presence of water in RHR emergency sump	3.3	30
005 Residual Heat Removal						X	A4.04	Ability to manually operate and/or monitor in the control room: - Controls and indication for closed cooling water pumps	3.1	31
006 Emergency Core Cooling					Х		A3.02	Ability to monitor automatic operation of the ECCS, including: - Pumps	4.1	32
006 Emergency Core Cooling		X					K5.04	Knowledge of the operational implications of the following concepts as they apply to the ECCS: - Brittle fracture, including causes and preventative actions	2.9	33

Facility Indian Dant II						]	PWR	R RO/S	SRO	Exa.	aat	ion Outline			
Facility: Indian Pont Ur ES-401	nit 2							C Writ Systen				on Outline	Form	<b>ES-40</b>	1-2
System #/Name	K1	K2	K3	<u>K</u> 4	K5		A1					Number	K/A Topic	Imp	Q#
007 Pressurizer Relief/Quench Tank	X											K1.01	Knowledge of the physical connections and/or cause-effect relationships between the PRTS and the following systems: - Containment system	2.9	34
008 Component Cooling Water											X	2.2.37	Equipment Control - Ability to determine operability and/or availability of safety related equipment.	3.6	35
008 Component Cooling Water								X				A2.04	Ability to (a) predict the impacts of the following malfunctions or operations on the CCWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - PRMS alarm	3.3	36
010 Pressurizer Pressure Control						x						K6.03	Knowledge of the effect of a loss or malfunction of the following will have on the PZR PCS: - PZR sprays and heaters	3.2	37
010 Pressurizer Pressure Control											X	2.1.23	Conduct of Operations - Ability to perform specific system and integrated plant procedures during all modes of plant operation.	4.4	87
012 Reactor Protection					X							K5.02	Knowledge of the operational implications of the following concepts as they apply to the RPS: - Power density	3.1	38
012 Reactor Protection											X	2.4.50	Emergency Procedures/Plan - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.0	88
013 Engineered Safety Features Actuation						X						K6.01	Knowledge of the effect of a loss or malfunction of the following will have on the ESFAS: - Sensors and detectors	2.7	40

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Facility: Indian Pont Un						n						on Outline	T.	EQ 401	•
ES-401	17.1	17/2	1720	17.4	177			Syste						Form ES-401-2	
System #/Name	K1	K2	K3	K4	K5	K6	AI	A2	A3	A4	-0 .	Number	K/A Topic	Imp	Q#
022 Containment Cooling			X									K3.01	Knowledge of the effect that a loss or malfunction of the CCS will have on the following: - Containment equipment subject to damage by high or low temperature, humidity, and pressure	2.9	41
022 Containment Cooling				x								K4.04	Knowledge of CCS design feature(s) and/or interlock(s) which provide for the following: - Cooling of control rod drive motors	2.8	39
026 Containment Spray		X										K2.01	Knowledge of bus power supplies to the following: - Containment spray pumps	3.0	42
039 Main and Reheat Steam				X								K4.05	Knowledge of MRSS design feature(s) and/or interlock(s) which provide for the following: - Automatic isolation of steam line	3.7	43
059 Main Feedwater			X									K3.02	Knowledge of the effect that a loss or malfunction of the MFW System will have on the following: - AFW System	3.6	44
059 Main Feedwater												A2.03	Ability to (a) predict the impacts of the following malfunctions or operations on the MFW System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Overfeeding event	3.1	89
061 Auxiliary/ Emergency Feedwater							Х					A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AFW System controls including: - S/G level	3.9	45

							PWR	RO/S	SRO I	Exa	.nati	ion Outline			
Facility: Indian Pont Ur	nit 2							~ ~ ~ .							
ES-401						D		2 writ Syster				on Outline	Form	ES-401	-2
System #/Name	K1	K2	K3	K4	K5	K6				A4		Number	K/A Topic	Imp	Q#
System #ritanic		112	110		110	110		Subscience and	1 10		Address Torright				
062 AC Electrical Distribution												A2.06	Ability to (a) predict the impacts of the following malfunctions or operations on the A.C. Distribution System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Keeping the safeguards buses electrically separate	3.4	47
062 AC Electrical Distribution							X					A1.01	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the A.C. Distribution System controls including: - Significance of D/G load limits	3.4	46
063 DC Electrical Distribution										X	a diversity	A4.03	Ability to manually operate and/or monitor in the control room: - Battery discharge rate	3.0	48
064 Emergency Diesel Generator	x											K1.05	Knowledge of the physical connections and/or cause-effect relationships between the ED/G System and the following systems: - Starting air system	3.4	49
073 Process Radiation Monitoring			x									K3.01	Knowledge of the effect that a loss or malfunction of the PRM System will have on the following: - Radioactive effluent releases	3.6	50
076 Service Water											X	2.4.25	Emergency Procedures/Plan - Knowledge of fire protection procedures.	3.3	52
076 Service Water								×				A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the SWS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of SWS	3.5	51

							PWF	R RO/S	SRO	Exanat	ion Outline	2			
Facility: Indian Pont U	Jnit 2														
·							NRO	C Wri	tten H	Examinati	on Outline				
ES-401						P	lant	Syster	<b>ms -</b> ]	lier 2 / Gr	oup 1	Form	ES-401	401-2	
System #/Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4 G	Number	K/A Topic	Imp	Q#	
		1	1			1	1								
078 Instrument Air		X									K2.01	Knowledge of bus power supplies to the following: - Instrument air compressor	2.7	53	
078 Instrument Air									X		A3.01	Ability to monitor automatic operation of the IAS, including: - Air pressure	3.1	54	
103 Containment				X							K4.06	Knowledge of Containment System design feature(s) and/or interlock(s) which provide for the following: - Containment isolation system	3.1	55	
103 Containment											A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the Containment System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Necessary plant conditions for work in containment	3.2	90	

Facility: Indian Pont Ur	cility: Indian Pont Unit 2								
5	NRC Written Examination Outline								
ES-401	Plant Systems - Tier 2 / Group 2	Form ES-401-2							
System #/Name	K1 K2 K3 K4 K5 K6 A1 A2 A3 A4 G Number K/A Topic	Imp Q#							
Bystein mitanie									

002 Reactor Coolant							A2.01	Ability to (a) predict the impacts of the following malfunctions or operations on the RCS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Loss of coolant inventory	4.3	56
011 Pressurizer Level Control					X			Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PZR LCS controls including: - Charging and letdown flows	3.3	58
015 Nuclear Instrumentation	X	ζ					K2.01	Knowledge of bus power supplies to the following: - NIS channels, components, and interconnections	3.3	57
033 Spent Fuel Pool Cooling			X				K4.02	Knowledge of Spent Fuel Pool Cooling System design feature(s) and/or interlock(s) which provide for the following: - Maintenance of spent fuel cleanliness	2.5	59
034 Fuel Handling Equipment						X	A3.03	Ability to monitor automatic operation of the Fuel Handling System, including: - High flux at shutdown	2.9	60
035 Steam Generator				X			K6.01	Knowledge of the effect of a loss or malfunction of the following will have on the S/GS: - MSIVs	3.2	61
041 Steam Dump/Turbine Bypass Control		X					K3.02	Knowledge of the effect that a loss or malfunction of the SDS will have on the following: - RCS	3.8	62

	PWR RO/SRO Examination Outline									Exa_	inati	on Outline	e			
Facility: Indian Pont U	Jnit 2						NR	C Writ	ten H	Exam	inatio	on Outline				
ES-401								System						rm ES-401-2		
System #/Name	<u>K</u> 1	<u>K</u> 2	K3	K4	<u>K</u> 5	K6	A1	A2	A3	A4	G	Number	K/A Topic	Imp	Q#	
045 Main Turbine Generator					X							K5.23	Knowledge of the operational implications of the following concepts as they apply to the MT/G System: - Relationship between rod control and RCS boron concentration during T/G load increases	2.7	65	
045 Main Turbine Generator												A2.17	Ability to (a) predict the impacts of the following malfunctions or operations on the MT/G System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Malfunction of electrohydraulic control	2.9	91	
055 Condenser Air Removal											X	2.4.50	Emergency Procedures/Plan - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	4.0	92	
071 Waste Gas Disposal										X		A4.26	Ability to manually operate and/or monitor in the control room: - Authorized waste gas release, conducted in compliance with radioactive gas discharge permit	3.1	63	
072 Area Radiation Monitoring	X											K1.01	Knowledge of the physical connections and/or cause-effect relationships between the ARM system and the following systems: - Plant ventilation systems	3.1	64	
086 Fire Protection												A2.02	Ability to (a) predict the impacts of the following malfunctions or operations on the Fire Protection System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: - Low FPS header pressure	3.3	93	

	dian Point		Date of Exam			2010	
Category	K/A #	Topic	R	0	SRO	-Only	
				IR	Q#	IR	Q#
	2.1.26	procedures (s equipment, e temperature,	of industrial safety such as rotating lectrical, high high pressure, caustic, gen and hydrogen).	3.4	68		
	2.1.42	Knowledge o movement pr	f new and spent fuel occedures.	2.5	67		
1. Conduct of Operations	2.1.25		erpret reference ch as graphs, curves,			4.2	94
	2.1.45	diverse indic	entify and interpret ations to validate the nother indication.			4.3	95
	Subtota	1			2		2
	2.2.1	procedures for operating tho	form pre-startup or the facility, including se controls associated uipment that could ity.	4.5	66		
	2.2.7	-	of the process for pecial or infrequent	2.9	69		
2. Equipment Control	2.2.41		tain and interpret ical and mechanical	3.5	70		
	2.2.19	Knowledge o order require	of maintenance work ments.			3.4	96
	2.2.21	Knowledge c maintenance requirements				4.1	97
							_
	Subtota	.1			3		2

Facility Indi	an Point I	Unit 2 Date of Exam		7/12/	2010	
Category	K/A #	Торіс	R	0	SRO-	
			IR	Q#	IR	Q#
	2.3.5	Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	2.9	71		
	2.3.7	Ability to comply with radiation work permit requirements during normal and abnormal conditions.	3.5	73		
3. Radiological Controls	2.3.12	Knowledge of radiological safety principles pertaining to licensed operator duties, such as containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.	3.2	72		
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.			3.8	98
	Subtota	1		3		1
	2.4.19	Knowledge of EOP layout, symbols, and icons.	3.4	74		
	2.4.29	Knowledge of the emergency plan.	3.1	75		
4. Emergency	2.4.25	Knowledge of fire protection procedures.			3.7	99
Procedures/plan	2.4.30	Knowledge of which events related to system operations/status that must be reported to internal organizations or external agencies, such as State, the NRC, or the transmission system operator.			4.1	100
	Subtota	l		2		2
Tier 3 Point Tot	als			10		7

ES-401		Record of Rejected K/As	Form ES-401-4		
Tier / Group		Randomly Selected K/A	Reason for Rejection		
R-1/1	000009 EK3.25	Knowledge of the reasons for the following responses as they apply to the small break LOCA: Monitoring of in-core T-cold	System does not exist at IPEC		
R-1/1	000017 G2.1.29	Reactor Coolant Pump (RCP) Malfunctions Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.	This Generic KA is not applicable to off- normal procedures		
R-1/1	000026 AK3.01	Knowledge of the reasons for the following responses as they apply to the Loss of Component Cooling Water: The conditions that will initiate the automatic opening and closing of the SWS isolation valves to	There is no automatic function at IPEC		
R-1/2	000067 AK3.04	the CCW/nuclear service water coolers067 Plant Fire on SiteActions contained in EOP for plant fire on site	EOPs do not contain actions for fire		
R-1/2	W/E01 G2.4.25	E01 Rediagnosis Knowledge of fire protection procedures.	EOPs do not contain actions for fire		
R-2/1	012000 K6.07	Knowledge of the effect of a loss or malfunction of the following will have on the RPS: Core protection calculator	Equipment not applicable at IPEC		

<b>R-2/1</b>	013000 K4.22	Knowledge of ESFAS design feature(s) and/or interlock(s) which provide for the following:	REJECT due to inability to write discriminatory RO level question
		Reason for shut safety injection pump discharge valve of train to be tested	
R-2/1	063000 K4.01	Knowledge of D.C. Electrical System design feature(s) and/or interlock(s) which provide for the following:	Rejected due to similarities with RO question #48
		Manual/automatic transfers of control	
R-2/1	013000 G2.1.21	Engineered Safety Features Actuation System (ESFAS)	Rejected due to inability to write discriminatory RO level question
		Ability to verify the controlled procedure copy.	
R-2/1	078000 K2.02	Knowledge of bus power supplies to the following:	Unit 2 does not have an emergency air compressor
		Emergency air compressor	
R-2/2	028000 AK1.02	Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the HRPS controls including:	REJECT due to inability to write discriminatory RO level question
		Containment pressure	
R-2/2	033000 G2.2.40	Spent Fuel Pool Cooling System (SFPCS)	Unit 2 does not have Tech Spec for SFP
		Ability to apply technical specifications for a system.	Cooling
R-2/2	079000 K4.01	Knowledge of SAS design feature(s) and/or interlock(s) which provide for the following:	Unit 2 does not have auto function/interlock for IAS & SAS
		Cross-connect with IAS	
R-3	2.1.9	Ability to direct personnel activities inside the control room.	ROs do not direct activities in control room

R-3	2.1.21	Ability to verify the controlled procedure copy.	Rejected due to inability to write discriminatory RO level question
R-3	2.3.15	Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	Rejected due to similarities with RO question #71
S-1/1	000022 G2.1.4	Loss of Rx Coolant Makeup Knowledge of individual licensed operator responsibilities related to shift staffing, such as medical requirements, "no solo" operation, maintenance of active license status, 10CFR55, etc.	Generic KA does not apply to system specific E/APE
S-1/1	000065 G2.4.16	Loss of Instrument Air Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, severe accident management guidelines.	Rejected due to similarities with SRO question #2
S-1/2	000068 G2.4.8	Control Room Evacuation Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	Rejected due to similarities with SRO question #2
S-1/2	000076 AA2.04	Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: Process effluent radiation chart recorder	Rejected due to over sampling of radiation monitors (See SRO questions 9 & 10)
S-2/1	056000 G2.3.15	Condensate System Knowledge of radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc.	Rejected Unit 2 does not have condensate system radiation monitors.

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S-3	2.4.5	Knowledge of the organization of the operating procedures network for normal, abnormal, and emergency evolutions.	Rejected due to similarities with SRO question #2

Facility:       Indian Point Unit 2       SRO-U       Operating Test No.:       July 12, 2010         Exam Level:       RO X       SRO-U       SRO-U       Operating Test No.:       Control Room Systems® (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)         Control Room Systems® (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)       Type Code*       Safety Function         a.       Realign a Misaligned Rod       M, A, S       1         b.       Terminate Safety Injection after Main Steam Line Break       N, S, EN       2         c.       Depressurize the RCS during SGTR using Aux Spray       D, A, S, EN       3         d.       Transfer from AFW to Low Flow Bypass Feed.       M, L, P, S       4-S         e.       Align Recirculation Spray       N, S, EN       5         f.       Restore Power to Bus 2A using 22 EDG       A, N, S       6         g.       Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low       D, A, S       9         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         j.       Start the Appendix R SBO EDG       N       6         k.       Perform Required Actions to Establish Backup Cooling the Atmospheric Steam Dump Valve for 21 SG       D, R, E       8         j. <th>ES-301 Cor</th> <th>trol Room/In-P</th> <th>lant Systems Ou</th> <th>utline</th> <th>Form ES-301-2</th>	ES-301 Cor	trol Room/In-P	lant Systems Ou	utline	Form ES-301-2
System / JPM Title       Type Code*       Safety Function         a.       Realign a Misaligned Rod       M, A, S       1         b.       Terminate Safety Injection after Main Steam Line Break       N, S, EN       2         c.       Depressurize the RCS during SGTR using Aux Spray       D, A, S, EN       3         d.       Transfer from AFW to Low Flow Bypass Feed.       M, L, P, S       4-S         e.       Align Recirculation Spray       N, S, EN       5         f.       Restore Power to Bus 2A using 22 EDG       A, N, S       6         g.       Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low       D, A, S       7         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       I.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6       8         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and fu		SRO-U			
Image: Second	Control Room Systems <sup>@</sup> (8 for R	O); (7 for SRO-I);	(2 or 3 for SRO-U,	including 1 ESF	)
b.       Terminate Safety Injection after Main Steam Line Break       N, S, EN       2         c.       Depressurize the RCS during SGTR using Aux Spray       D, A, S, EN       3         d.       Transfer from AFW to Low Flow Bypass Feed.       M, L, P, S       4-S         e.       Align Recirculation Spray       N, S, EN       5         f.       Restore Power to Bus 2A using 22 EDG       A, N, S       6         g.       Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low       D, A, S       7         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       D, A, E       4-P         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       N       6         j.       Start the Appendix R SBO EDG       N       6       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	System	/ JPM Title		Type Code*	
c.Depressurize the RCS during SGTR using Aux SprayD, A, S, EN3d.Transfer from AFW to Low Flow Bypass Feed.M, L, P, S4-Se.Align Recirculation SprayN, S, EN5f.Restore Power to Bus 2A using 22 EDGA, N, S6g.Perform Required Actions for 23 SG Pressure Channel (439B) Failing LowD, A, S7h.Adjust the Alarm setpoints for R-44 in preparation for a gaseous releaseN, S9In-Plant Systems® (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)D, A, E4-Pi.Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SGD, A, E4-Pj.Start the Appendix R SBO EDGN66k.Perform the Required Actions to Establish Backup Cooling to the Charging PumpsD, R, E8@All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	a. Realign a Misaligned Re	bd		M, A, S	1
d.Transfer from AFW to Low Flow Bypass Feed.M, L, P, S4-Se.Align Recirculation SprayN, S, EN5f.Restore Power to Bus 2A using 22 EDGA, N, S6g.Perform Required Actions for 23 SG Pressure Channel (439B) Failing LowD, A, S7h.Adjust the Alarm setpoints for R-44 in preparation for a gaseous releaseN, S9In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)D, A, E4-Pi.Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SGD, A, E4-Pj.Start the Appendix R SBO EDGN68k.Perform the Required Actions to Establish Backup Cooling to the Charging PumpsD, R, E8@All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems must serve different safe	b. Terminate Safety Injecti	on after Main Stea	am Line Break	N, S, EN	2
e.Align Recirculation SprayN, S, EN5f.Restore Power to Bus 2A using 22 EDGA, N, S6g.Perform Required Actions for 23 SG Pressure Channel (439B) Failing LowD, A, S7h.Adjust the Alarm setpoints for R-44 in preparation for a gaseous releaseN, S9In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)D, A, E4-Pi.Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SGD, A, E4-Pj.Start the Appendix R SBO EDGN6k.Perform the Required Actions to Establish Backup Cooling to the Charging PumpsD, R, E8@All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.In-plant systems must be different safety functions; in-plant systems must be different safety functions; in-plant systems may	c. Depressurize the RCS of	during SGTR using	g Aux Spray	D, A, S, EN	3
f.       Restore Power to Bus 2A using 22 EDG       A, N, S       6         g.       Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low       D, A, S       7         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       D, A, E       4-P         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	d. Transfer from AFW to L	ow Flow Bypass F	Feed.	M, L, P, S	4-S
g.       Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low       D, A, S       7         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       D, A, E       4-P         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	e. Align Recirculation Spra	iy		N, S, EN	5
(439B) Failing Low       N, S       9         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       D, A, E       4-P         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	f. Restore Power to Bus 2	A using 22 EDG		A, N, S	6
gaseous release       In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		ns for 23 SG Pres	sure Channel	D, A, S	7
i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		nts for R-44 in pre	paration for a	N, S	9
the Atmospheric Steam Dump Valve for 21 SG       N       6         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	In-Plant Systems <sup>@</sup> (3 for RO); (3	for SRO-I); (3 or 2	2 for SRO-U)		
k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	•		, ,	D, A, E	4-P
to the Charging Pumps         Image: Constraint of the Charging P	j. Start the Appendix R SI	BO EDG		N	6
functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		ctions to Establish	Backup Cooling	D, R, E	8
* Type Codes Criteria for RO / SRO-I / SRO-U	functions; all 5 SRO-U sys	tems must serve dif	systems must be different safety function	erent and serve diff s; in-plant systems	ferent safety s and functions may
	* Type Codes		Criteria	for RO / SRO-I / SI	RO-U

## ES-301 Control Room/In-Plant Systems Outline

- a. **Realign a Misaligned Control Bank Rod** in accordance with 2-AOP-ROD-1, *Rod Control Malfunctions*. One Control Bank Rod has become misaligned during power ascension with power level approximately 50%. When the candidate releases the IN-HOLD-OUT switch, the control rod will continue to withdraw. The candidate should reenter 2-AOP-ROD-1, trip the reactor and perform the Immediate Operator Actions for a Reactor Trip.
  - This is an Alternate Path JPM.
  - This is a Modified Bank JPM
  - Failure to properly perform this task will result in violation of TS and possible exceeding hot channel factors.
- b. Terminate Safety Injection after Main Steam Line Break. The plant experienced a steam break outside containment upstream of the MSIVs. Following the isolation of the faulted SG, the crew would transition to E-1; then, the crew would transition to ES-1.1, *SI Termination* using the foldout page criteria. This procedure flowpath does not have SI, or Phase A reset prior to entry. The candidate will be required to perform all actions to Reset SI and Phase A signals, then Terminate SI by securing the pumps.
  - This is a new JPM.
  - Failure to properly perform this JPM will result in SI flow continuing and possible PTS condition.
- c. **Depressurize the RCS during a SGTR using Aux Spray**. A SGTR of adequate size to cause an SI has occurred. 6.9 KV Bus 3 tripped on fault resulting in a loss of 23 RCP. All actions up to depressurize to refill the pressurizer and minimize break flow will have been completed. The PORV Block Valves will be danger tagged shut and PCV-455A (Loop 24 Spray Valve) will not open. The candidate will continue in 2-E-3, Steam Generator Tube Rupture and perform depressurization using Aux Spray.
  - This is an Alternate Path JPM.
  - This JPM directly from the JPM bank; however, it has not been used on the previous 2 NRC Exams.
  - Failure to properly perform this task will result in excessive loss of RCS inventory and possible SG overfill.
- d. **Transfer from AFW to Low Flow Bypass Feed**. The plant is at approximately 2-3% power. One MBFP has been started and is ready to provide flow to the SGs. In accordance with 2-SOP-21.1, *Main Feedwater System*, the candidate will transfer steam generator feedwater from the Auxiliary Feedwater System to the Main Feedwater Low Flow Bypass valves.
  - A similar JPM was used on the last Unit 3 exam; however the method used was different from the method used in this JPM.
  - Failure to properly perform this task will result in possible reactor trip on SG level.
- e. Align Recirculation Spray Flow. The plant has experienced a Large Break LOCA. Transfer to recirculation has been accomplished. When the RWST has decreased to 2 feet the operating Containment Spray pump must be secured and transfer to recirculation spray flow must be accomplished in accordance with 2-ES-1.3 *Transfer to Cold Leg Recirculation*. This JPM requires the candidate to ensure proper core flow while Recirculation Spray flow is established since the Recirculation Pumps will be providing both core cooling flow and containment spray flow.
  - This is a new JPM.
  - Failure to properly perform this task will result in failure to meet FSAR assumptions for lodine removal.

ES-301

Facility: Indian Point Unit 2		Date of Examination:July 12, 2010
Examination Level: RO X	SRO	Operating Test Number:
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
		Calculate Shutdown Margin
Conduct of Operations	N, R	<ul><li>2.1.25 Ability to interpret reference materials such as graphs, curves, tables etc.</li><li>2.1.19 Ability to use plant computers to evaluate system or component status</li></ul>
		Perform IR NIS COL (Control Room)
Conduct of Operations	N, S	2.1.29 Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc.
		Tagout BA Transfer Pump Discharge Valve
Equipment Control	N, R	2.2.13 Knowledge of tagging and clearance procedures.
		Determine Protective Clothing and Stay Time
Radiation Control	N, R	2.3.7 Ability to comply with radiation work permit requirements during normal and abnormal conditions.
		Not Applicable for RO
Emergency Procedures/Plan		
		ROs. RO applicants require only 4 items unless they are cs, when all 5 are required.
* Type Codes & Criteria:	(D)irect fron (N)ew or (M	om, (S)imulator, or Class(R)oom n bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) )odified from bank (≥ 1) 2 exams (≤ 1; randomly selected)

(A)Iternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
Direct from bank	≤9/≤8/≤4
(E)mergency or abnormal in-plant	≥1/≥1/≥1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥1/≥1/≥1
(N)ew or (M)odified from bank including 1(A)	≥2/≥2/≥1
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	≥1/≥1/≥1
(S)imulator	

#### ES-301

#### Administrative Topics Outline

#### Form ES-301-1

#### INDIAN POINT UNIT 2 NRC RO EXAMINATION

**CONDUCT OF OPERATIONS: Calculate Shutdown Margin** – The candidate will be given a set of conditions and asked to calculate Shutdown Margin. This is accomplished using any computer with access to the IPEC intranet to obtain current plant data from the On-Line NuPOP. The data is entered in the SDM calculation section of WRC-1.

- This is a New JPM
- RO Only

**CONDUCT OF OPERATIONS: Perform IR NIS COL (Control Room)** – The candidate is directed to perform the control room section of the IR NIS Check Off List. One switch will be out of position. The candidate must identify this switch and inform the CRS.

- This is a New JPM
- RO Only

**EQUIPMENT CONTROL:** Tagout BA Transfer Pump Discharge Valve – The candidate will be given plant prints and associated procedures and directed to prepare a manual tagout for the 21 Boric Acid Transfer Pump Discharge Valve. NOTE: Manual tagout JPMs exist in the JPM Bank; however, this component (BA pump discharge valve) is new and has not been used before.

- This is a New JPM
- RO Only

**RADIATION CONTROL: Determine Protective Clothing and Stay Time** – The candidate will be given an RWP for a task that must be performed in a Locked High Radiation Area. The candidate will also be given the exposure history for an individual. The candidate must determine the appropriate Protective Clothing required for the task and the allowed stay time for the individual without exceeding administrative limits.

- This is a New JPM
- RO Only

Facility:       Indian Point Unit 2       Date of Examination:       July 12, 2010         Exam Level:       RO       SRO-I X       SRO-U       Operating Test No.:         Control Room Systems <sup>®</sup> (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)       System / JPM Title       Type Code*       Safety Function         a.       Realign a Misaligned Rod       M, A, S       1         b.       Terminate Safety Injection after Main Steam Line Break       N, S, EN       2         c.       Depressurize the RCS during SGTR using Aux Spray       D, A, S, EN       3         d.       Transfer from AFW to Low Flow Bypass Feed.       M, L, P, S       4-S         e.       Align Recirculation Spray       N, S, EN       5         f.       NA for SROs       1       10, A, S       7         q.       Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low       D, A, S       7         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       1       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       N       6         j.       Start the Appendix R SBO EDG       N       6       8       6	ES-301	Control Room/In-Pla	ant Systems Out	lline	Form ES-301-2
System / JPM Title       Type Code*       Safety Function         a.       Realign a Misaligned Rod       M, A, S       1         b.       Terminate Safety Injection after Main Steam Line Break       N, S, EN       2         c.       Depressurize the RCS during SGTR using Aux Spray       D, A, S, EN       3         d.       Transfer from AFW to Low Flow Bypass Feed.       M, L, P, S       4-S         e.       Align Recirculation Spray       N, S, EN       5         f.       NA for SROs					
a.       Realign a Misaligned Rod       M, A, S       1         b.       Terminate Safety Injection after Main Steam Line Break       N, S, EN       2         c.       Depressurize the RCS during SGTR using Aux Spray       D, A, S, EN       3         d.       Transfer from AFW to Low Flow Bypass Feed.       M, L, P, S       4-S         e.       Align Recirculation Spray       N, S, EN       5         f.       NA for SROs	Control	Room Systems <sup>@</sup> (8 for RO); (7 for SRO-I); (	2 or 3 for SRO-U, i	ncluding 1 ESF)	
b.       Terminate Safety Injection after Main Steam Line Break       N, S, EN       2         c.       Depressurize the RCS during SGTR using Aux Spray       D, A, S, EN       3         d.       Transfer from AFW to Low Flow Bypass Feed.       M, L, P, S       4-S         e.       Align Recirculation Spray       N, S, EN       5         f.       NA for SROs        5         g.       Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low       D, A, S       7         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       I       4-P         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.		System / JPM Title		Type Code*	
c.       Depressurize the RCS during SGTR using Aux Spray       D, A, S, EN       3         d.       Transfer from AFW to Low Flow Bypass Feed.       M, L, P, S       4-S         e.       Align Recirculation Spray       N, S, EN       5         f.       NA for SROs	a.	Realign a Misaligned Rod		M, A, S	1
d.       Transfer from AFW to Low Flow Bypass Feed.       M, L, P, S       4-S         e.       Align Recirculation Spray       N, S, EN       5         f.       NA for SROs	b.	Terminate Safety Injection after Main Stear	m Line Break	N, S, EN	2
e.       Align Recirculation Spray       N, S, EN       5         f.       NA for SROs	C.	Depressurize the RCS during SGTR using	Aux Spray	D, A, S, EN	3
f.       NA for SROs         g.       Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low       D, A, S       7         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	d.	Transfer from AFW to Low Flow Bypass Fe	eed.	M, L, P, S	4-S
g.       Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low       D, A, S       7         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       D, A, E       4-P         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	e.	Align Recirculation Spray		N, S, EN	5
(439B) Failing Low       N, S       9         h.       Adjust the Alarm setpoints for R-44 in preparation for a gaseous release       N, S       9         In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       In-Plant Systems <sup>®</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)       D, A, E       4-P         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	f.	NA for SROs			
gaseous release       In-Plant Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)         i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	g.		ure Channel	D, A, S	7
i.       Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG       D, A, E       4-P         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	h.		aration for a	N, S	9
the Atmospheric Steam Dump Valve for 21 SG         j.       Start the Appendix R SBO EDG       N       6         k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	In-Plan	t Systems <sup>@</sup> (3 for RO); (3 for SRO-I); (3 or 2	for SRO-U)		
k.       Perform the Required Actions to Establish Backup Cooling to the Charging Pumps       D, R, E       8         @       All RO and SRO-I control room (and in-plant) systems must be different and serve different safety functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	i.			D, A, E	4-P
to the Charging Pumps         Image: Constraint of the Charging P	j.	Start the Appendix R SBO EDG		N	6
functions; all 5 SRO-U systems must serve different safety functions; in-plant systems and functions may overlap those tested in the control room.	k.		Backup Cooling	D, R, E	8
* Type Codes Criteria for RO / SRO-I / SRO-U	@	functions; all 5 SRO-U systems must serve diffe			
		* Type Codes	Criteria fo	or RO / SRO-I / SI	RO-U

(A)Iternate path	4-6 / 4-6 / 2-3
(C)ontrol room	
(D)irect from bank	≤ 9 / ≤ 8 / ≤ 4
(E)mergency or abnormal in-plant	≥1/≥1/≥1
(EN)gineered safety feature	- / - / ≥1 (control room system)
(L)ow-Power / Shutdown	≥1/≥1/≥1
N)ew or (M)odified from bank including 1(A)	≥2/≥2/≥1
(P)revious 2 exams	$\leq 3 / \leq 3 / \leq 2$ (randomly selected)
(R)CA	≥1/≥1/≥1
(S)imulator	

- f. **Restore power to bus 2A using 22 EDG**. Bus 2A normal supply breaker will be tripped on overcurrent. The candidate will use 2-SOP-480V-1, *Loss Of Normal Power To Any 480v Bus*. All 3 EDGs will have automatically started and be running unloaded. All of the loads on the bus will be removed and a visual inspection of the bus performed (Local action). The bus will be re-energized from the control room using the EDG supply breaker.
  - This is a New JPM.
  - This is an Alternate path JPM.
  - Failure to properly perform this task will result in reduction in redundant power supplies for safeguards equipment.
- g. Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low (alternate Path). The affected Steam Pressure Transmitter provides density compensation for the steam flow channel used in the Steam Generator Water Level Control System. Steam Pressure failing Low will result in Steam Flow failing Low. The Immediate Operator actions will attempt to place the unaffected steam flow transmitter in service. The switch will not function (stuck contacts) requiring the candidate to take manual control of the feedwater regulating valve and controlling level. Additional actions include tripping bistables to remove the channel from service.
  - This is a Bank JPM.
  - This JPM has never been used on an ILO NRC exam.
  - This is an Alternate path JPM.
  - Failure to properly perform this task will result in loss of control of SG level and possible Reactor Trip.
- h. Adjust the Alarm setpoints for R-44 in preparation for a gaseous release. In preparation for a gaseous waste release, the Warn and Alarm setpoint for Radiation Monitor 44, *Plant Vent Radio Gas*, must be changed. A Gaseous Waste Release Permit calculation indicates that the Alarm and Warn setpoint must be reset prior to the actual release. The candidate must change the Alarm and Warn setpoint to the values calculated on the Release Permit.
  - This is a New JPM.
  - Failure to properly perform this task may result in excessive release of radioactive gas to the environment.
- i. **Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG.** The JPM is part of the Appendix R actions. Instrument Air will not be available for the Atmospheric Steam Dump Valve. The candidate will be required to simulate connecting the alternate Nitrogen supply tank to the valve and control steam flow locally.
  - In Plant JPM
  - This is a Bank JPM.
  - This JPM has not been used at Unit 2 for initial NRC exams. The Nitrogen Bottles were recently added and this JPM was written for annual requal operating exam.
  - Failure to properly perform this task will result in inability to control RCS temperature during a control room evacuation.
- j. Start the Appendix R Emergency Diesel Generator. Using 2-SOP-27.6, *Unit 2* Appendix R Diesel Generator Operation, Start the Appendix R EDG Normal Engine Start (Parallel Mode). This is a relatively new piece of equipment. This EDG was not installed during the last NRC exam.
  - In Plant JPM
  - This is a New JPM.
  - Failure to properly perform this task will result in not supplying electrical power during control room evacuation event.

- Perform the Required Actions to Establish Backup Cooling to the Charging Pumps

   This JPM is part of the Appendix R actions. The control room is evacuated and CCW is
   not available to the charging pumps. The candidate is directed to align backup city water
   cooling to the charging pumps.
  - In Plant JPM
  - This JPM is directly from existing bank.
  - This JPM has not been used on the previous last 2 Unit 2 Initial NRC examinations. A similar JPM was used on the last Unit 3 Initial exam; however, the methodology is significantly different between units.
  - Failure to properly perform this task will result in inability to maintain RCS inventory and possible core damage.

### ES-301 Control Room/In-Plant Systems Outline

- a. **Realign a Misaligned Control Bank Rod** in accordance with 2-AOP-ROD-1, *Rod Control Malfunctions*. One Control Bank Rod has become misaligned during power ascension with power level approximately 50%. When the candidate releases the IN-HOLD-OUT switch, the control rod will continue to withdraw. The candidate should reenter 2-AOP-ROD-1, trip the reactor and perform the Immediate Operator Actions for a Reactor Trip.
  - This is an Alternate Path JPM.
  - This is a Modified Bank JPM
  - Failure to properly perform this task will result in violation of TS and possible exceeding hot channel factors.
- b. Terminate Safety Injection after Main Steam Line Break. The plant experienced a steam break outside containment upstream of the MSIVs. Following the isolation of the faulted SG, the crew would transition to E-1; then, the crew would transition to ES-1.1, *SI Termination* using the foldout page criteria. This procedure flowpath does not have SI, or Phase A reset prior to entry. The candidate will be required to perform all actions to Reset SI and Phase A signals, then Terminate SI by securing the pumps.
  - This is a new JPM.
  - Failure to properly perform this JPM will result in SI flow continuing and possible PTS condition.
- c. **Depressurize the RCS during a SGTR using Aux Spray**. A SGTR of adequate size to cause an SI has occurred. 6.9 KV Bus 3 tripped on fault resulting in a loss of 23 RCP. All actions up to depressurize to refill the pressurizer and minimize break flow will have been completed. The PORV Block Valves will be danger tagged shut and PCV-455A (Loop 24 Spray Valve) will not open. The candidate will continue in 2-E-3, Steam Generator Tube Rupture and perform depressurization using Aux Spray.
  - This is an Alternate Path JPM.
  - This JPM directly from the JPM bank; however, it has not been used on the previous 2 NRC Exams.
  - Failure to properly perform this task will result in excessive loss of RCS inventory and possible SG overfill.
- d. **Transfer from AFW to Low Flow Bypass Feed**. The plant is at approximately 2-3% power. One MBFP has been started and is ready to provide flow to the SGs. In accordance with 2-SOP-21.1, *Main Feedwater System*, the candidate will transfer steam generator feedwater from the Auxiliary Feedwater System to the Main Feedwater Low Flow Bypass valves.
  - A similar JPM was used on the last Unit 3 exam; however the method used was different from the method used in this JPM.
  - Failure to properly perform this task will result in possible reactor trip on SG level.
- e. Align Recirculation Spray Flow. The plant has experienced a Large Break LOCA. Transfer to recirculation has been accomplished. When the RWST has decreased to 2 feet the operating Containment Spray pump must be secured and transfer to recirculation spray flow must be accomplished in accordance with 2-ES-1.3 *Transfer to Cold Leg Recirculation*. This JPM requires the candidate to ensure proper core flow while Recirculation Spray flow is established since the Recirculation Pumps will be providing both core cooling flow and containment spray flow.
  - This is a new JPM.
  - Failure to properly perform this task will result in failure to meet FSAR assumptions for Iodine removal.

- f. Not Used for SROI candidates
- g. Perform Required Actions for 23 SG Pressure Channel (439B) Failing Low

(alternate Path). The affected Steam Pressure Transmitter provides density compensation for the steam flow channel used in the Steam Generator Water Level Control System. Steam Pressure failing Low will result in Steam Flow failing Low. The Immediate Operator actions will attempt to place the unaffected steam flow transmitter in service. The switch will not function (stuck contacts) requiring the candidate to take manual control of the feedwater regulating valve and controlling level. Additional actions include tripping bistables to remove the channel from service.

- This is a Bank JPM.
- This JPM has never been used on an ILO NRC exam.
- This is an Alternate path JPM.
- Failure to properly perform this task will result in loss of control of SG level and possible Reactor Trip.
- h. Adjust the Alarm setpoints for R-44 in preparation for a gaseous release. In preparation for a gaseous waste release, the Warn and Alarm setpoint for Radiation Monitor 44, *Plant Vent Radio Gas*, must be changed. A Gaseous Waste Release Permit calculation indicates that the Alarm and Warn setpoint must be reset prior to the actual release. The candidate must change the Alarm and Warn setpoint to the values calculated on the Release Permit.
  - This is a New JPM.
  - Failure to properly perform this task may result in excessive release of radioactive gas to the environment.
- i. Perform Required Actions to Dump Steam Locally Using the Atmospheric Steam Dump Valve for 21 SG. The JPM is part of the Appendix R actions. Instrument Air will not be available for the Atmospheric Steam Dump Valve. The candidate will be required to simulate connecting the alternate Nitrogen supply tank to the valve and control steam flow locally.
  - In Plant JPM
  - This is a Bank JPM.
  - This JPM has not been used at Unit 2 for initial NRC exams. The Nitrogen Bottles were recently added and this JPM was written for annual requal operating exam.
  - Failure to properly perform this task will result in inability to control RCS temperature during a control room evacuation.
- j. Start the Appendix R Emergency Diesel Generator. Using 2-SOP-27.6, *Unit 2* Appendix R Diesel Generator Operation, Start the Appendix R EDG Normal Engine Start (Parallel Mode). This is a relatively new piece of equipment. This EDG was not installed during the last NRC exam.
  - In Plant JPM
  - This is a New JPM.
  - Failure to properly perform this task will result in not supplying electrical power during control room evacuation event.
- Perform the Required Actions to Establish Backup Cooling to the Charging Pumps

   This JPM is part of the Appendix R actions. The control room is evacuated and CCW is
   not available to the charging pumps. The candidate is directed to align backup city water
   cooling to the charging pumps.
  - In Plant JPM
  - This JPM is directly from existing bank.

- This JPM has not been used on the previous last 2 Unit 2 Initial NRC examinations. A similar JPM was used on the last Unit 3 Initial exam; however, the methodology is significantly different between units.
- Failure to properly perform this task will result in inability to maintain RCS inventory and possible core damage.

Facility: <u>Indian Point Unit 2</u> Examination Level: RO	SRO X	Date of Examination: <u>July 12, 2010</u> Operating Test Number:
Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	N, R	Review WCR-1 2.1.25 Ability to interpret reference materials, such as graphs, curves, tables, etc.
Conduct of Operations	N, R	<b>Determine Location for Spent Fuel Assembly</b> 2.1.42 Knowledge of new and spent fuel movement procedures.
Equipment Control	N, R	Initiate a Temporary Procedure Change 2.2.6 Knowledge of the process for making changes to procedures.
Radiation Control	M, R, P	<b>Review/Approve a Liquid Radiation Release Permit</b> 2.3.11 Ability to control radiation releases.
Emergency Procedures/Plan	, D m D	Classify Security Event 2.4.28 Knowledge of procedures relating to a security event (non-safeguards information).
		Os. RO applicants require only 4 items unless they are s, when all 5 are required.
* Type Codes & Criteria:	(D)irect from (N)ew or (M	om, (S)imulator, or Class(R)oom n bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes) )odified from bank (≥ 1) : exams (≤ 1; randomly selected)

STO

Form ES-301-1

ES-301

Administrative Topics Outline

# INDIAN POINT UNIT 2 NRC BO EXAMINATION

**CONDUCT OF OPERATIONS: Review WCR-1** The candidate will be given a copy of WCR-1, Reactivity Summary Sheet prepared by an RO for review. The candidate will review the calculation and find an error. The candidate should NOT sign Reviewed By and return the form.

- This is a New JPM
- SRO Only

**CONDUCT OF OPERATIONS: Determine Location for Spent Fuel Assembly** This JPM gives the candidate a spent fuel assembly with initial enrichment and burnup. The spent fuel assembly must be moved in the pit. The candidate must determine the spent fuel pit location zone.

- This is a New JPM
- The SRO Only

**EQUIPMENT CONTROL: Initiate a Temporary Procedure Change**. This JPM will initiate a Temporary Procedure Change for 2-AOP-ROD-1. The procedure is missing a step to place the P-A converter in Manual before depressing the UP-Down buttons. (Note this step does exist in other locations in the procedure)

- This is a New JPM
- SRO Only.

**RADIATION CONTROL: Review a Liquid Radiation Release Permit**. This JPM has modified values from the existing bank version. The permit will have inaccurate information.

- This is a Modified Bank JPM
- SRO Only.

**EMERGENCY PROCEDURES/PLAN: Respond to a Security Event**. The candidate will be notified that a security event is in progress. The candidate must respond in accordance with 0-AOP-SEC-1 and classify the event. Once the event is classified, the candidate will have 15 minutes to complete the NY State Part 1 form.

- This is a Modified Bank JPM.
- SRO Only.

Facility: _	Indian Point	<u>t 2</u> Scena	rio No.: <u>1</u>	Op-Test No.: <u>1</u>
Examiners	:		Operators:	
The Plant PORV PC Turnover: Maintain 1 Critical Ta 1. Es R( 2. Iso	ulator to IC- is in a 100% V-456 and a 00% Power sks: stablish grea CPs in the F	ter than 400 R-H.1. (E-0- ater flow to	F)	o PCV-456 blowing fuses. fore transition out of E-0 or tripping the ed SG before transition to ECA-3.1
3. Es eit	tablish/Mair her of the fo RCS temp	ntain RCS te ollowing: perature too	high to maintain required subc	out of E-3 does not occur due to ooling ge to the subcriticality or integrity CSF.
		ination crite	ria are met, stop SI pumps befo	pre completion of ECA-3.3 step 9.
\	0/10.0 / 1			
Event No.	Malf. No.	Event Type*	D	Event escription
Event	Malf.			
Event No.	Malf. No.	Type* C(ATC)	23 MFRV fails closed in auto wiminutes.	escription ith manual available ramped over 10 causing automatic makeup and charging
Event No.	Malf. No. CNH- PCS008D XMT- CVC019	Type*C(ATC)C(CRS)I(CRS)	23 MFRV fails closed in auto wi minutes. VCT level instrument fails low of pump suction to swap to the RW	escription ith manual available ramped over 10 causing automatic makeup and charging
Event No. 1 2	Malf. No. CNH- PCS008D XMT- CVC019 A MAL- RCS014	Type* C(ATC) C(CRS) I(CRS) I(BOP) R(ATC) N(CRS)	23 MFRV fails closed in auto wiminutes. VCT level instrument fails low of pump suction to swap to the RW SGTL on 23 SG 900 gpd. This wishutdown.	escription ith manual available ramped over 10 causing automatic makeup and charging /ST.
Event No.	Malf. No. CNH- PCS008D XMT- CVC019 A MAL- RCS014 C MAL-	Type* C(ATC) C(CRS) I(CRS) I(BOP) R(ATC) N(CRS) N(BOP)	<ul> <li>23 MFRV fails closed in auto wiminutes.</li> <li>VCT level instrument fails low of pump suction to swap to the RW</li> <li>SGTL on 23 SG 900 gpd. This vishutdown.</li> <li>Loss of Station Auxiliary Transf 5 and 6 causing 480 V Buses 5A</li> </ul>	escription ith manual available ramped over 10 causing automatic makeup and charging /ST. vill require a downpower and eventual Former will result in loss of 6.9 KV Buses
Event No. 1 2 3 4	Malf. No. CNH- PCS008D XMT- CVC019 A MAL- RCS014 C MAL- EPS001 MAL- RCS014	Type* C(ATC) C(CRS) I(CRS) I(BOP) R(ATC) N(CRS) N(BOP) C(ALL)	<ul> <li>23 MFRV fails closed in auto wiminutes.</li> <li>VCT level instrument fails low of pump suction to swap to the RW</li> <li>SGTL on 23 SG 900 gpd. This vishutdown.</li> <li>Loss of Station Auxiliary Transfits and 6 causing 480 V Buses 5A</li> <li>SGTR on 23 SG grows to 280 grows to</li></ul>	escription ith manual available ramped over 10 causing automatic makeup and charging /ST. vill require a downpower and eventual former will result in loss of 6.9 KV Buses and 6A to be powered from their EDGs
Event No. 1 2 3 4 5	Malf. No. CNH- PCS008D XMT- CVC019 A MAL- RCS014 C MAL- EPS001 MAL- RCS014 C MAL-	Type* C(ATC) C(CRS) I(CRS) I(BOP) R(ATC) N(CRS) N(BOP) C(ALL) M(ALL)	<ul> <li>23 MFRV fails closed in auto wiminutes.</li> <li>VCT level instrument fails low of pump suction to swap to the RW SGTL on 23 SG 900 gpd. This vishutdown.</li> <li>Loss of Station Auxiliary Transf 5 and 6 causing 480 V Buses 5A SGTR on 23 SG grows to 280 granual reactor trip and SI.</li> <li>Fault on 480 V Bus 6A during the having no available PORVs.</li> <li>21 AFW pump will not auto start</li> </ul>	escription ith manual available ramped over 10 causing automatic makeup and charging /ST. vill require a downpower and eventual former will result in loss of 6.9 KV Buses and 6A to be powered from their EDGs

#### **Session Outline:**

The evaluation begins with the plant at 100% power steady state operation.

Shortly after the team takes the watch, 23 MFRV will slowly fail closed. The team should recognize the failure and the ATC should transfer control of the valve to manual per administrative guidance of EN-OP-115, Conduct of Operations. The team will enter 2-AOP-FW-1, Loss of Main Feedwater.

While the team is progressing through 2-AOP-FW-1 (or after exit), VCT level instrument LC-112 will fail low. This will cause an automatic makeup and charging pump suction to swap to the RWST. The team will respond per 2-AOP-CVCS-1, CVCS Malfunctions.

After the team has stabilized charging pump suction, a 900 gpd steam generator tube leak will develop on 23 SG. The team will implement 2-AOP-SG-1, Steam Generator Tube Leak, and begin a shutdown.

After the team starts the load reduction, a fault will occur on the Station Auxiliary Transformer (SAT). 6.9 KV Busses 5 and 6 will de-energize and 21 and 23 EDGs will auto start to re-power 480V Busses 5A and 6A. The team will implement 2-AOP-138KV-1, Loss of Power to 6.9 KV Bus 5 and/or 6.

While progressing with the shutdown and addressing the loss of SAT, the tube leakage in 23 SG will increase to 280 gpm. The team will diagnose the increase in leak rate and trip the reactor and actuate SI.

Following the reactor trip and SI, the team will have to establish AFW because 23 does not have power and 21 will not auto start (malfunction). 22 AFW pump must be placed in service to feed 23 and 24 SGs. 21 AFW may be manually started to feed 21 and 22 SGs or 22 AFW pump may be used to feed all four SGs. The team will progress through E-0, Reactor Trip or Safety Injection and transition to E-3, Steam Generator Tube Rupture. 23 SG will be isolated and the team will cool down the RCS in preparation to depressurize. The team will be unable to depressurize the RCS using E-3. Normal spray cannot be used because no RCPs are in service. Auxiliary spray will not be available because instrument air to containment will not be available (PCV-1228 will not open). Neither PORV will be available; one is tagged out, and the other's closed block valve does not have power. The team will transition to 2-ECA-3.3, SGTR without Pressurizer Pressure Control.

The scenario will be terminated when SI pumps have been stopped after RCS depressurization in ECA-3.3.

Procedural flow path: 2-AOP-FW-1, 2-AOP-CVCS-1, 2-AOP-SG-1, (2-POP-2.1, 2-AOP-RSD-1, or 2-AOP-RLR-1), 2-AOP-138KV-1, E-0, E-3, ECA-3.3

Examiners	S:		Operators:	
The Plant Turnover: Raise pow Critical Ta 1. In cc • • • 2. Es 3. M	ulator to IC-2 is in Mode 1 ver to approver sks: sert negative popleting FF De-energi Place rod Establish stablish at le anually actu	just above kimately 8-1 e reactivity i R-S.1 step 4 ze the contr control in m emergency ast 800 gpn	imulator Schedule-Scenario4 5% power preparing to come on line. 0% to place MTG in service. to the core by at least one of the following methods before : (FR-S.1C) rol rod drive MG sets nanual and insert RCCAs boration flow to the RCS n AFW flow to the SGs before completion of FR-S.1 step 3. (E-0 F) one train of SIS actuated safeguards before completion of E-0 step	Þ
4	(E-0 D)			
Event	Malf.	Event	Event	Ī
	Malf. No. N/A	Type*R(ATC)N(CRS)	Event Description Power escalation.	
Event No.	No.	Type* R(ATC)	Description	
Event No.	No. N/A MOC-	Type*R(ATC)N(CRS)N(BOP)C(CRS)	Description         Power escalation.         22 Service Water Pump trip.	
<b>Event</b> No. 1	No. N/A MOC- SWS007 XMT- RCS028	Type* R(ATC) N(CRS) N(BOP) C(CRS) C(BOP)	Description         Power escalation.         22 Service Water Pump trip.         Tech Spec for CRS         Controlling PZR Pressure transmitter fails high.         Tech Spec for CRS         FCV-625 spurious closure.	
Event No. 1 2 3	No. N/A MOC- SWS007 XMT- RCS028 A MOV-	Type* R(ATC) N(CRS) N(BOP) C(CRS) C(BOP) I(ALL) C(CRS) C(BOP) C(CRS)	Description         Power escalation.         22 Service Water Pump trip.         Tech Spec for CRS         Controlling PZR Pressure transmitter fails high.         Tech Spec for CRS         FCV-625 spurious closure.	W
Event No. 1 2 3 4	No. N/A MOC- SWS007 XMT- RCS028 A MOV- CCW008 MAL-	Type* R(ATC) N(CRS) N(BOP) C(CRS) C(BOP) I(ALL) C(CRS) C(BOP) N	Description         Power escalation.         22 Service Water Pump trip.         Tech Spec for CRS         Controlling PZR Pressure transmitter fails high.         Tech Spec for CRS         FCV-625 spurious closure.	W M

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U2 NRC 2010 Scenario 4: Power escalation from 5%, SWP Trip, PT-455 Failure, FCV-625 Closure, Steam Line Rupture, ATWS, Faulted SG.

#### **Session Outline:**

The scenario begins with the plant at 5% power with no equipment is out of service. The team has been instructed to raise power to 8-10% and place MTG in service.

After taking the watch, the crew will commence raising power. After the power escalation has progressed, 22 SWP will trip. The team will start another pump per 2-ARP-SJF.

Following the restoration of SW, a failure high of PT-455 will occur. The team will respond using 2-AOP-INST-1 "Instrument or Controller Failures." The channel will be removed from service.

After the channel is removed from service, FCV-625 will go closed with no apparent reason. The team should respond per 2-ARP-SGF and re-open the valve. If the team elects to not re-open the valve, the scenario can continue.

Prior to completion of the Subsequent Actions of 2-AOP-CCW-1, a steam break will occur in the Turbine Building. The team will attempt to manually trip the plant but the reactor trip breakers will not open.

The reactor will not trip from the Control Room and the team will respond per 2-FR-S.1, "Response to Nuclear Power Generation / ATWS," and will shutdown the reactor by manually inserting control rods and initiating Emergency Boration. The reactor trip breakers will not be locally opened after an NPO is dispatched, until after emergency Boration has been aligned. One MSIV will fail to close from the control switches. The team will proceed through 2-FR-S.1 until transition to 2-E-0, "Reactor Trip or Safety Injection."

After the transition to 2-E-0 is made, the team will determine that three SGs are intact and 23 SG is faulted. The Team will also determine that SI did not automatically actuate and must manually actuate SI. The team will transition to 2-E-2, Faulted Steam Generator Isolation and isolate 23 SG. The scenario is terminated after the actions of 2-E-2 are complete and a transition to 2-E-1, Loss of Reactor or Secondary Coolant is announced or at the discretion of the lead examiner.

Procedure flow path: 2-POP-1.3, 2-ARP-SJF, 2-AOP-INST-1, 2-ARP-SGF, 2-AOP-UC-1, 2-E-0, 2-FR-S.1, 2-E-0, 2-E-2

aonty			ario No.: <u>5 (spare)</u> M Op-Test No.: <u>1</u>	
Examiner	'S:		Operators:	
Initial Cor	ditions:			Î
Reset sim	nulator to IC-		imulator Schedule-Scenario3	
			l power lineup. r 4 hours due to bearing oil line repair.	
Turnover:				
	100% Power			
Critical Ta				
	stablish RCS VR. (FR-H.1-		feed when the average of the three lowest S/G levels reach 41%	
	`	,	and want values before resulting Clin ED 114 (new MOC)	
			ead vent valves before resetting SI in FR-H.1 (non-WOG)	
3. C	lose all reac	tor vessel h	ead vent valves before exiting 2-FR-H.1. (FR-H.1-G)	
3. C Event	Malf. No.	tor vessel h	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event         Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in	
3. C Event No.	Malf. No.	tor vessel h Event Type*	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event         Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in service and enter 2-AOP-INST-1.	
3. C Event No.	Malf. No. XMT- SGN002 A MAL-	tor vessel h Event Type*	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event         Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in service and enter 2-AOP-INST-1.         Tech Spec Evaluation for CRS         Loss of 480V Bus 3A. Team will enter 2-AOP-480V-1 and diagnose that	
3. C Event No.	Malf. No. XMT- SGN002 A	tor vessel h Event Type* I(ALL)	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in service and enter 2-AOP-INST-1.         Tech Spec Evaluation for CRS         Loss of 480V Bus 3A. Team will enter 2-AOP-480V-1 and diagnose that a T.S. shutdown is required due to having 2 inoperable AFW pumps.	
3. C Event No.	Malf. No. XMT- SGN002 A MAL-	tor vessel h Event Type* I(ALL) C(ALL)	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in service and enter 2-AOP-INST-1.         Tech Spec Evaluation for CRS         Loss of 480V Bus 3A. Team will enter 2-AOP-480V-1 and diagnose that a T.S. shutdown is required due to having 2 inoperable AFW pumps.	
3. C Event No. 1 2	Malf. No. XMT- SGN002 A MAL- EPS007B	tor vessel h Event Type* I(ALL) C(ALL) R(ATC) N(CRS) N(BOP)	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in service and enter 2-AOP-INST-1.         Tech Spec Evaluation for CRS         Loss of 480V Bus 3A. Team will enter 2-AOP-480V-1 and diagnose that a T.S. shutdown is required due to having 2 inoperable AFW pumps.         Tech Spec Evaluation for CRS         Mathematical AFW pumps.         Tech Spec Evaluation for CRS         Mathematical AFW pumps.	
3. C Event No.	Malf. No. XMT- SGN002 A MAL-	tor vessel h Event Type* I(ALL) C(ALL) R(ATC) N(CRS) N(BOP) C(CRS)	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in service and enter 2-AOP-INST-1.         Tech Spec Evaluation for CRS         Loss of 480V Bus 3A. Team will enter 2-AOP-480V-1 and diagnose that a T.S. shutdown is required due to having 2 inoperable AFW pumps.         Tech Spec Evaluation for CRS         Adv fragen 2         Adv fragen 2         ADP-480V-1 and diagnose that a T.S. shutdown is required due to having 2 inoperable AFW pumps.         Adv fragen 2         Adv frag	
3. C Event No. 1 2 3	Malf. No. XMT- SGN002 A MAL- EPS007B MAL- CVC002 A	tor vessel h Event Type* I(ALL) C(ALL) R(ATC) N(CRS) N(BOP)	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in service and enter 2-AOP-INST-1.         Tech Spec Evaluation for CRS         Loss of 480V Bus 3A. Team will enter 2-AOP-480V-1 and diagnose that a T.S. shutdown is required due to having 2 inoperable AFW pumps.         Tech Spec Evaluation for CRS         Image: Colspan="2">Continued operation for CRS         21 RCP Number 1 Seal leak. Team will have to enter 2-AOP-RCP-1. Continued operation is allowed with existing leakage. 21 RCP seal leakage will increase until tripping the pump and reactor is required.	-
3. C Event No. 1 2 3 4	Malf. No. XMT- SGN002 A MAL- EPS007B MAL- CVC002 A MAL- CVC002	tor vessel h Event Type* I(ALL) C(ALL) R(ATC) N(CRS) N(BOP) C(CRS) C(ATC) C(ATC) C(ATC)	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in service and enter 2-AOP-INST-1.         Tech Spec Evaluation for CRS         Loss of 480V Bus 3A. Team will enter 2-AOP-480V-1 and diagnose that a T.S. shutdown is required due to having 2 inoperable AFW pumps.         Tech Spec Evaluation for CRS         Inter Spec Evaluation for CRS         21 RCP Number 1 Seal leak. Team will have to enter 2-AOP-RCP-1. Continued operation is allowed with existing leakage. 21 RCP seal leakage will increase until tripping the pump and reactor is required.         TWM Work Work Work Work Work Work Work Work	golle c F
3. C Event No. 1 2 3	Malf. No. XMT- SGN002 A MAL- EPS007B MAL- CVC002 A	tor vessel h Event Type* I(ALL) C(ALL) R(ATC) N(CRS) N(BOP) C(CRS)	ead vent valves before exiting 2-FR-H.1. (FR-H.1—G)         Event Description         21 SG B Channel of Steam Flow Fails high. Team will place Channel in service and enter 2-AOP-INST-1.         Tech Spec Evaluation for CRS         Loss of 480V Bus 3A. Team will enter 2-AOP-480V-1 and diagnose that a T.S. shutdown is required due to having 2 inoperable AFW pumps.         Tech Spec Evaluation for CRS         Image: Colspan="2">Continued operation for CRS         21 RCP Number 1 Seal leak. Team will have to enter 2-AOP-RCP-1. Continued operation is allowed with existing leakage. 21 RCP seal leakage will increase until tripping the pump and reactor is required.	golle tu

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Loss of Secondary Heat Sink, Bleed and Feed required, following SG Steam Flow Failure, Loss of 480V Bus, Failure of RCP #1 Seal, Turbine trip failure.

#### **Session Outline:**

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The evaluation begins with the plant at 100% power steady state operation. The following equipment is out of service:

• 22 AFW pump has been out-of-service for bearing oil line repair for 4 hours. It is expected back within the next 6 hours (ITS 3.7.5 – 72 hr AOT). 21 and 23 AFW pumps are protected equipment.

After taking the watch, 21 SG Steam Flow Channel B transmitter will fail high. The ATC will switch to the A channel and the team will enter 2-AOP-INST-1. The CRS will refer to Tech Spec Table 3.3.2-1 and bistables will be tripped.

After bistables are tripped, a fault will occur on 480V Bus 3A. The team will take actions in accordance with AOP-480V-1, "Loss of Normal Power to any Safeguards 480V Bus." Due to the fault on Bus 3A, 22 EDG cannot re-energize the bus. TS require plant shutdown due to 2 trains of AFW inoperable (TS 3.7.5 condition C).

After team has begun shutdown, 21 RCP will experience #1 seal degradation. The team will perform actions of AOP-RCP-1, Reactor Coolant Pump Malfunctions." The #1 seal degradation severity will then increase requiring reactor trip.

When the reactor is tripped, the turbine upper left stop and control valve pair fail to close. LIST MSIV's must be manually closed to trip the turbine.

23 ABFP will not auto start and will not be able to be manually started from the Control Room due to 480V circuit breaker failure. (21 ABFP is de-energized due to fault on bus 3A, and 22 ABFP is out of service.)

The team will subsequently transition to FR-H.1, "Loss of Secondary Heat Sink" due to a loss of AFW flow. SG WR levels will lower until bleed and feed is required.

One PRZR PORV will not open when required. The crew will open the Reactor Head Vent valves. 21 AFW pump will then be successfully started from its ASSS supply, or 23 AFW pump from its normal supply after swapping 480V breakers with the spare breaker. The scenario can be terminated after the head vent valves have been closed, or at the discretion of the lead evaluator.

Procedure flow path: 2-AOP-INST-1, 2-AOP-480V-1, 2-POP-2.1 or 2-AOP-RSD-1, 2-AOP-RCP-1, 2-E-0, 2-FR-H.1