OUTLINE SUBMISSION

Includes:

Outline Submission Comments
ES-301-1
ES-301-2
ES-401-2
Scenario 1 D-1
Scenario 2 D-1
Scenario 3 D-1
K/A Selection Methodology

Outline Submission Comments

There were no NRC comments on the submitted outline.

Facility: Kewaunee Power Station	Date of Examination: 4/13 & 20/2009
Examination Level: RO ☑ SRO ☐	Operating Test Number: 2009301

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	S N	Perform section 2.9.5, NIS High Flux at Shutdown Alarm Test, of N-FH-53 CLD, Daily Refueling Checklist. (2.1.36 - Knowledge of procedures and limitations involved in core alterations. IMP – 3.0)
Conduct of Operations	S D P	RO-033-JP05C Perform Independent Verification of SI Valve Lineup. (2.1.29 – Knowledge of how to conduct system lineups, such as valves, breakers, switches, etc. IMP – 4.1)
Equipment Control	S D	RO-087-JP01B, Perform a Calorimetric/Heat Balance, SP-87-125 section 6.7.3. (2.2.44 – Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. IMP – 4.2)
Radiation Control	R N	Dressout in accordance with RWP Directions. (2.3.7 – Ability to comply with radiation work permit requirements during normal or abnormal conditions. IMP – 3.5)
Emergency Procedures/Plan	-	Not Selected.

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

* Type Codes & Criteria:
(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Kewaunee Power Station	Date of Examination: 4/13 & 20/2009
Exam Level: RO ☑ SRO-I ☐ SRO-U ☐	Operating Test No.: 2009301

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. ECCS / RO-E01-JP041 Operate Safety Injection System in Recirc Mode.	D, S, EN, A	2
b. Prz Pressure Control / RO-036-JP025A Depressurize the RCS during Cooldown.	N, S, L	3
c. Primary Heat Removal / RO-034-JP06A Shutdown RHR for At Power Operation.	N, S, L	4 (P)
d. Secondary Heat Removal / RO-054-JP061 Rapid Power Reduction to ~ 540 MWe.	D, S, A	4 (S)
e. Electrical / RO-039-JP09A Restore Normal Emergency Bus Lineup Following Blackout.	D, S	6
f. Radiation Monitor / RO-045-JP08A Realign Containment Sampling from R-21.	M, S	7
g. Circulating Water / RO-004-JP031 Respond to Trip of Circulating Water Pump.	N, S, A	8
h. CVCS / RO-035-JP23A Perform Boration of the RWST.	D, S	1
In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)		
i. Fire (Air System) / RO-E07-JP013 Align Alternate Instrument Air Header to Containment with a Fire in a Dedicated Zone.	D, E, R, A	8
j. Reactor Building Vent / AO-018-JP01A Operate and Monitor the Post LOCA Hydrogen Control System.	D, R	5
k. Boric Acid / AO-035-JP011 Operate Emergency Boration Valve Locally.	M, E, R, A	1

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.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate 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	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

Facility: Kewaunee Power Station	Date of Examination: 4/13 & 20/2009
Examination Level: RO ☐ SRO ☑	Operating Test Number: 1-1

Administrative Topic (see Note)	Type Code*	Describe activity to be performed
Conduct of Operations	R N	Review completed N-FH-53 CLD, Daily Refueling Checklist, with errors. (2.1.36 – Knowledge of procedures and limitations involved in core alterations. IMP – 4.1)
Conduct of Operations	R N	Review SP-37-065, Reactor Coolant Chemistry Surveillance, results for any required Technical Specification actions. (2.1.34 – Knowledge of primary and secondary plant chemistry limits. IMP – 3.5)
Equipment Control	R (S) N	Determine appropriate actions for system operations with inoperable equipment – DG inoperable and SI Accumulator level low. (2.2.44 – Ability to interpret control room indications to verify the status and operation of a system, and understand how operator actions and directives affect plant and system conditions. IMP – 4.4)
Radiation Control	R N	Review Emergency Exposure Authorization for ED approval. (2.3.7 – Ability to comply with radiation work permit requirements during normal or abnormal conditions. IMP – 3.6)
Emergency Procedures/Plan	S N	Classify an event condition based upon plant conditions (Scenario related). [Two different JPMs developed in coordination for the SRO to classify based upon final conditions following scenario completion] (2.4.41 – Knowledge of the emergency action level thresholds and classifications. IMP – 4.5)

NOTE: All items (5 total) are required for SROs. RO applicants require only 4 items unless they are retaking only the administrative topics, when all 5 are required.

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(C)ontrol room, (S)imulator, or Class(R)oom
(D)irect from bank (≤ 3 for ROs; ≤ 4 for SROs & RO retakes)
(N)ew or (M)odified from bank (≥ 1)
(P)revious 2 exams (≤ 1; randomly selected)

Facility: Kewaunee Power Station	Date of Examination: 4/13 & 20/2009
Exam Level: RO ☐ SRO-I ☑ SRO-U ☐	Operating Test No.: 1-1

Control Room Systems@ (8 for RO); (7 for SRO-I); (2 or 3 for SRO-U, including 1 ESF)

System / JPM Title	Type Code*	Safety Function
a. ECCS / RO-E01-JP041 Operate Safety Injection System in Recirc Mode.	D, S, EN, A	2
b. Prz Pressure Control / RO-036-JP25A Depressurize the RCS during Cooldown.	N, S, L	3
c. Primary Heat Removal / RO-034-JP06A Shutdown RHR for At Power Operation.	N, S, L	4 (P)
d. Secondary Heat Removal / RO-054-JP061 Rapid Power Reduction to ~ 540 MWe.	D, S, A	4 (S)
e. Electrical / RO-039-JP09A Restore Normal Emergency Bus Lineup Following Blackout.	D, S	6
f. Radiation Monitor / RO-045-JP08A Realign Containment Sampling from R-21.	M, S	7
g. Circulating Water / RO-004-JP031 Respond to Trip of Circulating Water Pump.	N, S, A	8
h. NOT USED		

In-Plant Systems@ (3 for RO); (3 for SRO-I); (3 or 2 for SRO-U)

System / JPM Title	Type Code*	Safety Function
i. Fire (Air System) / RO-E07-JP013 Align Alternate Instrument Air Header to Containment with a Fire in a Dedicated Zone.	D, E, R, A	8
j. Reactor Building Vent / AO-018-JP01A Operate and Monitor the Post LOCA Hydrogen Control System.	D, R	5
k. Boric Acid / AO-035-JP011 Operate Emergency Boration Valve Locally.	M, E, R, A	1

@ 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.

* Type Codes	Criteria for RO / SRO-I / SRO-U
(A)lternate 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	≤ 3 / ≤ 3 / ≤ 2 (randomly selected)
(R)CA	≥ 1 / ≥ 1 / ≥ 1
(S)imulator	

<table>
<tr><td colspan="9">Facility: Kewaunee</td><td colspan="10">Date of Exam: 4/13-20/2009</td></tr>
<tr><td rowspan="2">Tier</td><td rowspan="2">Group</td><td colspan="12">RO K/A Category Points</td><td colspan="5">SRO-Only Points</td></tr>
<tr><td>K 1</td><td>K 2</td><td>K 3</td><td>K 4</td><td>K 5</td><td>K 6</td><td>A 1</td><td>A 2</td><td>A 3</td><td>A 4</td><td>G *</td><td>Total</td><td colspan="2">A2</td><td colspan="2">G*</td><td>Total</td></tr>
<tr><td rowspan="3">1.
Emergency & Abnormal Plant Evolutions</td><td>1</td><td>3</td><td>2</td><td>3</td><td colspan="3" rowspan="3">N/A</td><td>4</td><td>2</td><td colspan="2" rowspan="3">N/A</td><td>4</td><td>18</td><td colspan="2">3</td><td colspan="2">3</td><td>6</td></tr>
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<tr><td>Tier Totals</td><td>4</td><td>3</td><td>5</td><td>6</td><td>4</td><td>5</td><td>27</td><td colspan="2">4</td><td colspan="2">6</td><td>10</td></tr>
<tr><td rowspan="3">2.
Plant Systems</td><td>1</td><td>4</td><td>2</td><td>2</td><td>2</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td><td>4</td><td>3</td><td>28</td><td colspan="2">2</td><td colspan="2">3</td><td>5</td></tr>
<tr><td>2</td><td>1</td><td>-</td><td>1</td><td>1</td><td>1</td><td>1</td><td>-</td><td>2</td><td>1</td><td>1</td><td>1</td><td>10</td><td>1</td><td>1</td><td colspan="2">1</td><td>3</td></tr>
<tr><td>Tier Totals</td><td>5</td><td>2</td><td>3</td><td>3</td><td>4</td><td>3</td><td>2</td><td>4</td><td>3</td><td>5</td><td>4</td><td>38</td><td colspan="2">4</td><td colspan="2">4</td><td>8</td></tr>
<tr><td colspan="5" rowspan="2">3. Generic Knowledge and Abilities Categories</td><td colspan="2">1</td><td colspan="2">2</td><td colspan="2">3</td><td colspan="2">4</td><td rowspan="2">10</td><td>1</td><td>2</td><td>3</td><td>4</td><td rowspan="2">7</td></tr>
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</table>

Note:

1. Ensure that at least two topics from every applicable K/A category are sampled within each tier of the RO 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.
3. Systems/evolutions within each group are identified on the associated outline; systems or evolutions that 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.
4. Select topics from as many systems and evolutions as possible; sample every system or evolution 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.
6. Select SRO topics for Tiers 1 and 2 from the shaded systems and K/A categories.

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.

8. 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.
9. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, IRs, and point totals (#) on Form ES-401-3. Limit SRO selections to K/As that are linked to 10 CFR 55.43.

ES-401 PWR Examination Outline Form ES-401-2

Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (**RO** ~~/ SRO~~)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1				X			1.04 - Ability to operate and/or monitor the following as they apply to a reactor trip: RCP operation and flow rates	3.6	1
000008 Pressurizer Vapor Space Accident / 3				X			1.03 - Ability to operate and/or monitor the following as they apply to the Pressurizer Vapor Space Accident: Turbine bypass in manual control to maintain header pressure	2.8	1
000009 Small Break LOCA / 3						X	2.4.6 - Knowledge of EOP mitigation strategies.	3.7	1
000011 Large Break LOCA / 3		X					2.02 - Knowledge of the interrelations between the Large Break LOCA and the following: Pumps	2.6	1
000015/17 RCP Malfunctions / 4			X				3.02 - Knowledge of the reasons for the following responses as they apply to the Reactor Coolant Pump Malfunctions: CCW lineup and flow paths to RCP oil coolers	3.0	1
000022 Loss of Rx Coolant Makeup / 2					X		2.03 - Ability to determine and interpret the following as they apply to the Loss of Reactor Coolant Makeup: Failures of flow control valve or controller	3.1	1
000025 Loss of RHR System / 4						X	2.4.45 - Ability to prioritize and interpret the significance of each annunciator or alarm.	4.1	1
000026 Loss of Component Cooling Water / 8						X	2.2.37 – Ability to determine operability and/or availability of safety related equipment.	3.6	1
000027 Pressurizer Pressure Control System Malfunction / 3				X			1.01 - Ability to operate and/or monitor the following as they apply to the Pressurizer Pressure Control Malfunctions: PZR heaters, sprays, and PORVs	4.0	1
000029 ATWS / 1							(Not Selected)		
000038 Steam Gen. Tube Rupture / 3	X						1.03 - Knowledge of the operational implications of the following concepts as they apply to the SGTR: Natural circulation	3.9	1
000040 (BW/E05; CE/E05; **W/E12**) Steam Line Rupture - Excessive Heat Transfer / 4		X					2.2 - Knowledge of the interrelations between the Uncontrolled Depressurization of all Steam Generators 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	3.6	1
000054 (CE/E06) Loss of Main Feedwater / 4	X						1.02 - Knowledge of the operational implications of the following concepts as they apply to Loss of Main Feedwater (MFW): Effects of feedwater introduction on dry S/G	3.6	1
000055 Station Blackout / 6				X			1.04 - Ability to operate and/or monitor the following as they apply to a Station Blackout: Reduction of loads on the battery	3.5	1
000056 Loss of Off-site Power / 6			X				3.02 - Knowledge of the reasons for the following responses as they apply to the Loss of Offsite Power: Actions contained in EOP for loss of offsite power	4.4	1

ES-401							PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (**RO** ~~/ SRO~~)		Form ES-401-2
E/APE # / Name / Safety Function	K1	K2	K3	A1	A2	G	K/A Topic(s)	IR	#
000057 Loss of Vital AC Inst. Bus / 6						**X**	2.1.19 - Ability to use plant computer to obtain and evaluate parametric information on system or component status.	3.9	1
000058 Loss of DC Power / 6	**X**						1.01 - Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation	2.8	1
000062 Loss of Nuclear Svc Water / 4							(Not Selected)		
000065 Loss of Instrument Air / 8							(Not Selected)		
W/E04 LOCA Outside Containment / 3			**X**				3.4 - Knowledge of the reasons for the following responses as they apply to the LOCA Outside Containment:: RO or SRO function within the control room team as appropriate to the assigned position, in such a way that procedures are adhered to and the limitations in the facilities license and amendments are not violated	3.6	1
W/E11 Loss of Emergency Coolant Recirc. / 4							(Not Selected)		
BW/E04; **W/E05** Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4					**X**		2.2 - Ability to determine and interpret the following as they apply to the Loss of Secondary Heat Sink: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.7	1
000077 Generator Voltage and Electric Grid Disturbances / 6							(Not Selected)		
K/A Category Totals:	3	2	3	4	2	4	Group Point Total:		18~~/6~~

ES-401							PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (**RO** ~~/ SRO~~)		Form ES-401-2
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1							(Not Selected)		
000003 Dropped Control Rod / 1				**X**			1.06 - Ability to operate and/or monitor the following as they apply to the Dropped Control Rod: RCS pressure and temperature	4.0	1
000005 Inoperable/Stuck Control Rod / 1							(Not Selected)		
000024 Emergency Boration / 1							(Not Selected)		
000028 Pressurizer Level Malfunction / 2							(Not Selected)		
000032 Loss of Source Range NI / 7							(Not Selected)		
000033 Loss of Intermediate Range NI / 7							(Not Selected)		
000036 (BW/A08) Fuel Handling Accident / 8		**X**					2.02 - Knowledge of the interrelations between the Fuel Handling Incidents and the following: Radiation monitoring equipment (portable and installed)	3.4	1
000037 Steam Generator Tube Leak / 3				**X**			1.11 - Ability to operate and/or monitor the following as they apply to the Steam Generator Tube Leak: PZR level indicator	3.4	1
000051 Loss of Condenser Vacuum / 4					**X**		2.02 - Ability to determine and interpret the following as they apply to the Loss of Condenser Vacuum: Conditions requiring reactor and/or turbine trip	3.9	1
000059 Accidental Liquid RadWaste Rel. / 9							(Not Selected)		
000060 Accidental Gaseous Radwaste Rel. / 9							(Not Selected)		
000061 ARM System Alarms / 7			**X**				3.02 - Knowledge of the reasons for the following responses as they apply to the Area Radiation Monitoring (ARM) System Alarms: Guidance contained in alarm response for ARM system	3.4	1
000067 Plant Fire On-site / 8							(Not Selected)		
000068 (BW/A06) Control Room Evac. / 8			**X**				3.07 - Knowledge of the reasons for the following responses as they apply to the Control Room Evacuation: Maintenance of S/G level, using AFW flow control valves	4.0	1
000069 (W/E14) Loss of CTMT Integrity / 5							(Not Selected)		
000074 (**W/E06**&E07) Inad. Core Cooling / 4						**X**	2.4.31 - Knowledge of annunciators alarms and indications, and use of the response instructions.	4.2	1
000076 High Reactor Coolant Activity / 9					**X**		2.02 - Ability to determine and interpret the following as they apply to the High Reactor Coolant Activity: Corrective actions required for high fission product activity in RCS	2.8	1
W/EO1 & E02 Rediagnosis & SI Termination / 3							(Not Selected)		
W/E13 Steam Generator Over-pressure / 4							(Not Selected)		
W/E15 Containment Flooding / 5							(Not Selected)		
W/E16 High Containment Radiation / 9							(Not Selected)		
BW/A01 Plant Runback / 1							(Not Applicable to plant)		
BW/A02&A03 Loss of NNI-X/Y / 7							(Not Applicable to plant)		

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (**RO** ~~/ SRO~~)	Form ES-401-2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
BW/A04 Turbine Trip / 4							(Not Applicable to plant)		
BW/A05 Emergency Diesel Actuation / 6							(Not Applicable to plant)		
BW/A07 Flooding / 8							(Not Applicable to plant)		
BW/E03 Inadequate Subcooling Margin / 4							(Not Applicable to plant)		
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							(Not Selected)		
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4							(Not Selected)		
BW/E13&E14 EOP Rules and Enclosures							(Not Applicable to plant)		
CE/A11; **W/E08** RCS Overcooling - PTS / 4	**X**						1.1 - Knowledge of the operational implications of the following concepts as they apply to the Pressurized Thermal Shock: Components, capacity, and function of emergency systems	3.5	1
CE/A16 Excess RCS Leakage / 2							(Not Applicable to plant)		
CE/E09 Functional Recovery							(Not Applicable to plant)		
K/A Category Point Totals:	1	1	2	2	2	1	Group Point Total:		9~~/4~~

ES-401 PWR Examination Outline Form ES-401-2
Plant Systems - Tier 2/Group 1 (RO ~~/ SRO~~)

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump			X			X						3.02 - Knowledge of the effect that a loss or malfunction of the RCPS will have on the following: S/G 6.14 - Knowledge of the effect of a loss or malfunction of the following will have on the RCPS: Starting requirements	3.5 2.6	2
004 Chemical and Volume Control					X							5.14 - Knowledge of the operational implications of the following concepts as they apply to the CVCS: Reduction process of gas concentration in RCS: vent-accumulated non-condensable gases from PZR bubble space, depressurized during cooldown or by alternately heating and cooling (spray) within allowed pressure band (drive more gas out of solution)	2.5	1
005 Residual Heat Removal					X					X		5.01 – Knowledge of the operational implications of the following concepts as they apply to the RHRS: Nil ductility transition temperature (brittle fracture) 4.03 - Ability to manually operate and/or monitor in the control room: RHR temperature, PZR heaters and flow, and nitrogen	2.6 2.8	2
006 Emergency Core Cooling		X										2.02 - Knowledge of bus power supplies to the following: Valve operators for accumulators	2.5	1
007 Pressurizer Relief/Quench Tank							X				X	1.01 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the PRTS controls including: Maintaining quench tank water level within limits 2.1.20 - Ability to interpret and execute procedure steps.	2.9 4.6	2
008 Component Cooling Water							X					1.03 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the CCWS controls including: CCW pressure	2.7	1
010 Pressurizer Pressure Control					X							5.01 - Knowledge of the operational implications of the following concepts as they apply to the PZR PCS: Determination of condition of fluid in PZR, using steam tables	3.5	1
012 Reactor Protection									X			3.02 - Ability to monitor automatic operation of the RPS, including: Bistables	3.6	1

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
013 Engineered Safety Features Actuation						X						6.01 - Knowledge of the effect of a loss or malfunction of the following will have on the ESFAS: Sensors and detectors	2.7	1
022 Containment Cooling		X									X	2.01 - Knowledge of bus power supplies to the following: Containment cooling fans 2.4.2 - Knowledge of system set points, interlocks and automatic actions associated with EOP entry conditions.	3.0 4.5	2
025 Ice Condenser												(Not Applicable to plant – No system)		
026 Containment Spray								X				2.08 - Ability to (a) predict the impacts of the following malfunctions or operations on the CSS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Safe securing of containment spray (when it can be done)	3.2	1
039 Main and Reheat Steam	X											1.07 - Knowledge of the physical connections and/or cause-effect relationships between the MRSS and the following systems: AFW	3.4	1
059 Main Feedwater	X											1.02 - Knowledge of the physical connections and/or cause-effect relationships between the MFW System and the following systems: AFW System	3.4	1
061 Auxiliary/Emergency Feedwater				X								4.03 - Knowledge of AFW System design feature(s) and/or interlock(s) which provide for the following: Automatic blowdown/sample isolation	2.7	1
062 AC Electrical Distribution				X								4.05 - Knowledge of A.C. Distribution System design feature(s) and/or interlock(s) which provide for the following: Paralleling of ac sources (synchroscope)	2.7	1
063 DC Electrical Distribution									X			3.01 - Ability to monitor automatic operation of the D.C. Electrical System, including: Meters, annunciators, dials, recorders, and indicating lights	2.7	1
064 Emergency Diesel Generator								X		X		2.19 - Ability to (a) predict the impacts of the following malfunctions or operations on the ED/G System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Consequences of high VARS on ED/G integrity 4.05 - Ability to manually operate and/or monitor in the control room: Transfer of ED/G control between manual and automatic	2.5 3.1	2
073 Process Radiation Monitoring										X		4.01 - Ability to manually operate and/or monitor in the control room: Effluent release	3.9	1

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (RO ~~/ SRO~~)	Form ES-401-2

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
076 Service Water	X										X	1.01 - Knowledge of the physical connections and/or cause-effect relationships between the SWS and the following systems: CCW system 2.4.50 - Ability to verify system alarm setpoints and operate controls identified in the alarm response manual.	3.4 4.2	2
078 Instrument Air	X									X		1.02 - Knowledge of the physical connections and/or cause-effect relationships between the IAS and the following systems: Service air 4.01 - Ability to manually operate and/or monitor in the control room: Pressure gauges	2.7 3.1	2
103 Containment			X									3.03 - Knowledge of the effect that a loss or malfunction of the Containment System will have on the following: Loss of containment integrity under refueling operations	3.7	1
K/A Category Point Totals:	4	2	2	2	3	2	2	2	2	4	3	Group Point Total:		28~~/5~~

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (**RO** ~~/ SRO~~)	Form ES-401-2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive												(Not Selected)		
002 Reactor Coolant								X				2.03 - 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 forced circulation	4.1	1
011 Pressurizer Level Control												(Not Selected)		
014 Rod Position Indication			X									3.02 - Knowledge of the effect that a loss or malfunction of the RPIS will have on the following: Plant computer	2.5	1
015 Nuclear Instrumentation										X		4.02 - Ability to manually operate and/or monitor in the control room: NIS indicators	3.9	1
016 Non-nuclear Instrumentation												(Not Selected)		
017 In-core Temperature Monitor												(Not Selected)		
027 Containment Iodine Removal												(Not Applicable to plant – No system)		
028 Hydrogen Recombiner and Purge Control					x							5.03 – Knowledge of the operational implications of the following concepts as they apply to the HRPS: Sources of hydrogen in containment	2.9	1
029 Containment Purge								X				2.03 - Ability to (a) predict the impacts of the following malfunctions or operations on the Containment Purge System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Startup operations and the associated required valve lineups	2.7	1
033 Spent Fuel Pool Cooling												(Not Selected)		
034 Fuel Handling Equipment											X	2.1.32 – Ability to explain and apply system limits and precautions	3.8	1
035 Steam Generator												(Not Selected)		
041 Steam Dump/Turbine Bypass Control						X						6.03 - Knowledge of the effect of a loss or malfunction of the following will have on the SDS: Controller and positioners, including ICS, S/G, CRDS	2.7	1
045 Main Turbine Generator												(Not Selected)		
055 Condenser Air Removal									X			3.03 - Ability to monitor automatic operation of the CARS, including: Automatic diversion of CARS exhaust	2.5	1
056 Condensate	X											1.03 - Knowledge of the physical connections and/or cause-effect relationships between the Condensate System and the following systems: MFW	2.6	1

ES-401 PWR Examination Outline Form ES-401-2

Plant Systems - Tier 2/Group 2 (**RO** ~~/ SRO~~)

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
068 Liquid Radwaste												(Not Selected)		
071 Waste Gas Disposal												(Not Selected)		
072 Area Radiation Monitoring												(Not Selected)		
075 Circulating Water												(Not Selected)		
079 Station Air												(Not Selected)		
086 Fire Protection				**X**								4.01 - Knowledge of Fire Protection System design feature(s) and/or interlock(s) which provide for the following: Adequate supply of water for FPS	3.1	1
K/A Category Point Totals:	1	-	1	1	1	1	-	2	1	1	1	Group Point Total:		10~~/3~~

ES-401							PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (~~RO /~~ **SRO**)		Form ES-401-2
E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000007 (BW/E02&E10; CE/E02) Reactor Trip - Stabilization - Recovery / 1							(Not Selected)		
000008 Pressurizer Vapor Space Accident / 3							(Not Selected)		
000009 Small Break LOCA / 3							(Not Selected)		
000011 Large Break LOCA / 3							(Not Selected)		
000015/**17** RCP Malfunctions / 4					X		2.02 - Ability to determine and interpret the following as they apply to the Reactor Coolant Pump Malfunctions (Loss of RC Flow): Abnormalities in RCP air vent flow paths and/or oil cooling system	3.0	1
000022 Loss of Rx Coolant Makeup / 2							(Not Selected)		
000025 Loss of RHR System / 4					X		2.05 - Ability to determine and interpret the following as they apply to the Loss of Residual Heat Removal System: Limitations on LPI flow and temperature rates of change	3.5	1
000026 Loss of Component Cooling Water / 8							(Not Selected)		
000027 Pressurizer Pressure Control System Malfunction / 3							(Not Selected)		
000029 ATWS / 1						X	2.4.8 - Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	4.5	1
000038 Steam Gen. Tube Rupture / 3							(Not Selected)		
000040 (BW/E05; CE/E05; W/E12) Steam Line Rupture - Excessive Heat Transfer / 4							(Not Selected)		
000054 (CE/E06) Loss of Main Feedwater / 4							(Not Selected)		
000055 Station Blackout / 6							(Not Selected)		
000056 Loss of Off-site Power / 6						X	2.2.38 - Knowledge of conditions and limitations in the facility license.	4.5	1
000057 Loss of Vital AC Inst. Bus / 6						X	2.4.11 - Knowledge of abnormal condition procedures	4.2	1
000058 Loss of DC Power / 6							(Not Selected)		
000062 Loss of Nuclear Svc Water / 4							(Not Selected)		
000065 Loss of Instrument Air / 8							(Not Selected)		
W/E04 LOCA Outside Containment / 3					X		2.1 - Ability to determine and interpret the following as they apply to the LOCA Outside Containment: Facility conditions and selection of appropriate procedures during abnormal and emergency operations	4.3	1
W/E11 Loss of Emergency Coolant Recirc. / 4							(Not Selected)		

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 1 (~~RO /~~ **SRO**)	Form ES-401-2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
BW/E04; W/E05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4							(Not Selected)		
000077 Generator Voltage and Electric Grid Disturbances / 6							(Not Selected)		
K/A Category Totals:					3	3	Group Point Total:		~~18/~~6

ES-401 PWR Examination Outline Form ES-401-2
Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (~~RO /~~ **SRO**)

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
000001 Continuous Rod Withdrawal / 1							(Not Selected)		
000003 Dropped Control Rod / 1							(Not Selected)		
000005 Inoperable/Stuck Control Rod / 1							(Not Selected)		
000024 Emergency Boration / 1						X	2.4.47 - Ability to diagnose and recognize trends in an accurate and timely manner utilizing the appropriate control room reference material.	4.2	1
000028 Pressurizer Level Malfunction / 2							(Not Selected)		
000032 Loss of Source Range NI / 7							(Not Selected)		
000033 Loss of Intermediate Range NI / 7							(Not Selected)		
000036 (BW/A08) Fuel Handling Accident / 8							(Rejected)		
000037 Steam Generator Tube Leak / 3							(Not Selected)		
000051 Loss of Condenser Vacuum / 4							(Not Selected)		
000059 Accidental Liquid RadWaste Rel. / 9							(Not Selected)		
000060 Accidental Gaseous Radwaste Rel. / 9						X	2.4.41 - Knowledge of the emergency action level thresholds and classifications.	4.6	1
000061 ARM System Alarms / 7							(Not Selected)		
000067 Plant Fire On-site / 8						X	2.4.8 - Knowledge of how abnormal operating procedures are used in conjunction with EOPs.	4.5	1
000068 (BW/A06) Control Room Evac. / 8							(Not Selected)		
000069 (W/E14) Loss of CTMT Integrity / 5							(Not Selected)		
000074 (W/E06&E07) Inad. Core Cooling / 4							(Not Selected)		
000076 High Reactor Coolant Activity / 9							(Not Selected)		
W/EO1 & E02 Rediagnosis & SI Termination / 3					X		2.2 Ability to determine and interpret the following as they apply to the Reactor Trip or Safety Injection/Rediagnosis: Adherence to appropriate procedures and operation within the limitations in the facility's license and amendments	3.3	1
W/E13 Steam Generator Over-pressure / 4							(Not Selected)		
W/E15 Containment Flooding / 5							(Not Selected)		
W/E16 High Containment Radiation / 9							(Not Selected)		
BW/A01 Plant Runback / 1							(Not Selected)		
BW/A02&A03 Loss of NNI-X/Y / 7							(Not Selected)		
BW/A04 Turbine Trip / 4							(Not Selected)		
BW/A05 Emergency Diesel Actuation / 6							(Not Selected)		

ES-401	PWR Examination Outline Emergency and Abnormal Plant Evolutions - Tier 1/Group 2 (~~RO /~~ **SRO**)	Form ES-401-2

E/APE # / Name / Safety Function	K 1	K 2	K 3	A 1	A 2	G	K/A Topic(s)	IR	#
BW/A07 Flooding / 8							(Not Selected)		
BW/E03 Inadequate Subcooling Margin / 4							(Not Selected)		
BW/E08; W/E03 LOCA Cooldown - Depress. / 4							(Not Selected)		
BW/E09; CE/A13; W/E09&E10 Natural Circ. / 4							(Not Selected)		
BW/E13&E14 EOP Rules and Enclosures							(Not Selected)		
CE/A11; W/E08 RCS Overcooling - PTS / 4							(Not Selected)		
CE/A16 Excess RCS Leakage / 2							(Not Selected)		
CE/E09 Functional Recovery							(Not Selected)		
K/A Category Point Totals:					1	3	Group Point Total:		~~9/~~4

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (~~RO /~~ **SRO**)	Form ES-401-2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
003 Reactor Coolant Pump												(Not Selected)		
004 Chemical and Volume Control												(Not Selected)		
005 Residual Heat Removal												(Not Selected)		
006 Emergency Core Cooling												(Not Selected)		
007 Pressurizer Relief/Quench Tank												(Not Selected)		
008 Component Cooling Water												(Not Selected)		
010 Pressurizer Pressure Control											**X**	2.2.22 - Knowledge of limiting conditions for operations and safety limits.	4.7	1
012 Reactor Protection												(Not Selected)		
013 Engineered Safety Features Actuation												(Not Selected)		
022 Containment Cooling												(Not Selected)		
025 Ice Condenser												(Not Selected)		
026 Containment Spray											**X**	2.2.25 - Knowledge of bases in technical specifications for limiting conditions for operations and safety limits.	4.2	1
039 Main and Reheat Steam								**X**				2.04 - Ability to (a) predict the impacts of the following malfunctions or operations on the MRSS and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Malfunctioning steam dump	3.7	1
059 Main Feedwater								**X**				2.03 - 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	1
061 Auxiliary/Emergency Feedwater												(Not Selected)		
062 AC Electrical Distribution											**X**	2.2.38 - Knowledge of conditions and limitations in the facility license.	4.5	1
063 DC Electrical Distribution												(Not Selected)		
064 Emergency Diesel Generator												(Not Selected)		
073 Process Radiation Monitoring												(Not Selected)		
076 Service Water												(Not Selected)		

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 1 (~~RO /~~ **SRO**)	Form ES-401-2

System # / Name	K1	K2	K3	K4	K5	K6	A1	A2	A3	A4	G	K/A Topic(s)	IR	#
078 Instrument Air												(Not Selected)		
103 Containment												(Not Selected)		
												(Not Selected)		
												(Not Selected)		
												(Not Selected)		
K/A Category Point Totals:								2			3	Group Point Total:		~~28/~~5

ES-401	PWR Examination Outline Plant Systems - Tier 2/Group 2 (~~RO /~~ **SRO**)	Form ES-401-2

System # / Name	K 1	K 2	K 3	K 4	K 5	K 6	A 1	A 2	A 3	A 4	G	K/A Topic(s)	IR	#
001 Control Rod Drive												(Not Selected)		
002 Reactor Coolant											**X**	2.1.7 - Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.7	1
011 Pressurizer Level Control												(Not Selected)		
014 Rod Position Indication												(Not Selected)		
015 Nuclear Instrumentation												(Not Selected)		
016 Non-nuclear Instrumentation												(Not Selected)		
017 In-core Temperature Monitor								**X**				2.01 - Ability to (a) predict the impacts of the following malfunctions or operations on the ITM System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Thermocouple open and short circuits	3.5	1
027 Containment Iodine Removal												(Not Selected)		
028 Hydrogen Recombiner and Purge Control												(Not Selected)		
029 Containment Purge												(Not Selected)		
033 Spent Fuel Pool Cooling												(Not Selected)		
034 Fuel Handling Equipment					**X**							5.03 - Knowledge of the operational implications of the following concepts as they apply to the Fuel Handling System: Residual heat removal; decay	2.7	1
035 Steam Generator												(Not Selected)		
041 Steam Dump/Turbine Bypass Control												(Not Selected)		
045 Main Turbine Generator												(Not Selected)		
055 Condenser Air Removal												(Not Selected)		
056 Condensate												(Not Selected)		
068 Liquid Radwaste												(Not Selected)		
071 Waste Gas Disposal												(Not Selected)		
072 Area Radiation Monitoring												(Not Selected)		
075 Circulating Water												(Not Selected)		
079 Station Air												(Not Selected)		
086 Fire Protection												(Not Selected)		
K/A Category Point Totals:					1			1			1	Group Point Total:		~~10~~/3

Facility: Kewaunee Power Station Date of Exam: 04/13/2009

Category	K/A #	Topic	RO		SRO-Only	
			IR	#	IR	#
1. Conduct of Operations	2.1.7	Ability to evaluate plant performance and make operational judgments based on operating characteristics, reactor behavior, and instrument interpretation.	4.4	1		
	2.1.37	Knowledge of procedures, guidelines, or limitations associated with reactivity management.	4.3	1		
	2.1.3	Knowledge of shift or short term relief turnover practices.			3.9	1
	2.1.36	Knowledge of procedure and limitations involved in core alterations.			4.1	1
	2.1.					
	2.1.					
	Subtotal			2		2
2. Equipment Control	2.2.15	Ability to determine the expected plant configuration using design and configuration control documentation, such as drawings, line-ups, tag-outs, etc.	3.9	1		
	2.2.36	Ability to analyze the effect of maintenance activities, such as degraded power sources, on the status of limiting conditions for operations.	3.1	1		
	2.2.41	Ability to obtain and interpret station electrical and mechanical drawings.	3.5	1		
	2.2.23	Ability to track Technical Specification limiting conditions for operations.			4.6	1
	2.2.37	Ability to determine operability and/or availability of safety related equipment.			4.6	1
	2.2.					
	Subtotal			3		2
3. Radiation Control	2.3.11	Ability to control radiation releases.	3.8	1		
	2.3.14	Knowledge of radiation or contamination hazards that may arise during normal, abnormal, or emergency conditions or activities.	3.4	1		
	2.3.13	Knowledge of radiological safety procedures pertaining to licensed operator duties, such as response to radiation monitor alarms, containment entry requirements, fuel handling responsibilities, access to locked high-radiation areas, aligning filters, etc.			3.8	1
	2.3.					
	2.3.					
	2.3.					
	Subtotal			2		1

4. Emergency Procedures / Plan	2.4.16	Knowledge of EOP implementation hierarchy and coordination with other support procedures or guidelines such as, operating procedures, abnormal operating procedures, and severe accident management guidelines.	3.5	1		
	2.4.21	Knowledge of the parameters and logic used to assess the status of safety functions, such as reactivity control, core cooling and heat removal, reactor coolant system integrity, containment conditions, radioactivity release control, etc.	4.0	1		
	2.4.35	Knowledge of local auxiliary operator tasks during an emergency and the resultant operational effects.	3.8	1		
	2.4.26	Knowledge of facility protection requirements, including fire brigade and portable fire fighting equipment usage.			3.6	1
	2.4.30	Knowledge of events related to system operation/status that must be reported to internal organizations or external agencies, such as the State, the NRC, or the transmission system operator.			4.1	1
	2.4.					
	Subtotal			3		2
Tier 3 Point Total				10		7

Facility: Kewaunee Power Station Scenario No.: 1 Op-Test No.: 1

Examiners: ______________ Operators: SRO: SRO-I (8, 3,6, 7)
ATC: SRO-I (1, 2, 4), RO-4
BOP: RO-(3, 5, 2, 1)

Initial Conditions: 100% power MOL Equilibrium Xenon. RCS boron concentration is 968 ppm. RCS Tave is 572ºF. Generator load is 601 MWe gross.

Turnover: Maintain 100% power. Equipment OOS: 1) T/D ADFW Pump for TD AFW pump: Auxiliary Lube Oil Pump Overhaul per CMP-05B-03, 2) NI Channel N43 failed and removed from service per AOP-GEN-MISC-001 4 hours ago, 3) PR-1A closed and power maintained for PR-2A seat leakage TS 3.1.a.5.A.1, 4) Boric Acid Totalizer

Event No.	Malf. No.	Event Type*	Event Description
Preload	SI05B	C	Failure to Auto Start, SI Pump 1B
Preload	RX222 579.8	I	PT-485 HP Turbine Impulse Pressure fails as-is (~ 579.6 psig)
1	TU03A, 40	C (BOP)	Turbine Bearing High Temperature (Front Bearing) [Turbine High Vibrations, Bearing #1]
		N	Load backdown due to turbine high vibrations
		R	Power reduction due to turbine high vibrations
2	RX222 579.8	I (Both)	PT-485, Turbine First Stage Pressure instrument fails as-is affecting steam dumps and auto rod control (Tref) during backdown
3	RC08 0.5	C (RO)	RCS System Leaks. 15 gpm RCS leak develops at RCS Loop A RHR line tap.
4	FW207 0, 1:00	I (BOP)	LT-471 SG B level transmitter 24046 Yellow. SG B controlling level channel fails low over 60 seconds
5	RC03A 0.2	M (Both)	Loss of Coolant – Hot Leg (1A). RCS leak becomes small break LOCA resulting in reactor trip and Safety Injection
6	ED08E	C (BOP)	Loss of 4160 (Bus 1-5). Bus 5 lockout resulting in loss of Train A ECCS/ESF equipment. DG starts on SI signal
7	SI05B	C (RO)	Failure to Auto Start, SI Pump B requiring manual start of SI Pump

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO <u>1-1</u> OVERVIEW

EVENT	DESCRIPTION
1	Turbine Bearing High Temperature on Bearing #1 results in increased turbine vibration. Alarm 47051-U, TURBINE VIBRATION HIGH, actuates. The ARP will direct the crew to lower turbine load to reduce vibration level. Engineering will report that the condition appears to be caused by a steam imbalance and recommends a power reduction to 90% within 20 minutes. The US will direct the load reduction using AOP-GEN-002, Rapid Load Reduction. The RO will perform a boration and monitor reactivity parameters for the load reduction. The BOP will manipulate the turbine controls and monitor secondary plant parameters during the load reduction. Vibrations will lower and stabilize as load is reduced.
2	Turbine first stage pressure fails as-is, PT-485. The instrument is stuck when the crew takes the shift; passive failure. Tref will remain constant during the load reduction. Tave-Tref meter will not be consistent with other plant indications, PPCS will alarm for P-486/P-485 deviation and rod motion will not be consistent with expectations for a rapid power reduction. The crew will diagnose the failure of the instrument. The US will direct entry into OP-KW-AOP-MISC-001, Response to Instrument Failure. The RO will be required to take manual rod control and insert rods as necessary to maintain Tave. Steam Dump control is also affected as steam dumps will not respond correctly to high RCS Tave since with Tref elevated. The BOP will be required to place steam dump controls to STEAM PRESSURE mode. Actions for manual rod control and steam dumps are directed by OP-KW-AOP-MISC-001, Response to Instrument Failure.
3	A RCS leak of approximately 15 to 20 gpm will develop on the RCS Loop A Hot Leg at the RHR piping weld. Containment humidity and pressure will rise. The speed of charging pump in AUTO will increase to maintain PRZR level on program. Containment sump A level will rise and annunciators 47031-Q, Containment Sump A Level High and 47031-P, Containment Sump A Level Hi-HI will activate. The crew will diagnose a RCS leak and per ARPs OP-KW-ARP-47031-Q, Containment Sump A Level High, and OP-KW-ARP-47031-P, Containment Sump A Level Hi-Hi, the US will direct entry into OP-KW-AOP-RC-001, Reactor Coolant Leak. The crew will stabilize the plant and determine a leak rate. Technical Specification 3.1.d.1.B limits unidentified leakage to 1 gpm. ACTION statement 3.1.d.2 requires the leakage be reduced to within limits within 4 hours. ACTION statement 3.1.d.3 requires action to achieve HOT SHUTDOWN within 6 hours and COLD SHUTDOWN within an additional 30 hours, if the time limit of 3.1.d.2 is exceeded. EAL classification SU5.1, Unidentified or pressure boundary leakage > 10 gpm.

4	Steam Generator B controlling level channel (LT-471) will fail low (from 44%) over 60 seconds. The failure will result in an increase in feed flow to Steam Generator B. Steam Generator B level and feed flow alarms will rise and alert the BOP to the abnormal condition. Per OP-KW-AOP-GEN-001, Immediate Operator Actions (for abnormal SG level), the BOP will take FW-7B to manual and maintain SG level between 30% and 50%. The crew will transition to OP-KW-AOP-MISC-001, Response to Instrument Failure, to address the failed channel. Technical Specification 3.5.b is addressed. Table TS 3.5-2, item 12 (Lo-Lo SG water level reactor trip) is verified satisfied with the two other level channels (LT-472 & LT-473) for SG B OPERABLE. Table TS 3.5-3, items 4.a and 5.a (SG Lo-Lo level AFW auto start) is verified satisfied with the two other level channels for SG B OPERABLE. TS Table 3.3-4, item 4.a (Hi-Hi SG level FW Isolation) level of redundancy is not satisfied until the bistable for Hi-Hi SG Level associated with LT-471 is tripped. This requires implementation TS 3.5.c to place the plant in hot shutdown. The note in OP-KW-AOP-MISC-001 defines the time requirement as soon as practical in TS 3.5.c as using the time requirements of TS 3.0.c. The crew has one hour to trip the Hi-Hi SG level bistable associated with LT-471 or commence a plant shutdown to hot shutdown. TS 3.0.c time requirements are within one hour action shall be taken to place the plant in a mode in which the specification does not apply by placing it, as applicable, in: Hot standby within the next 6 hours, at least hot shutdown within the following 6 hours.
5	The RCS leak worsens and becomes a small-break LOCA exceeding charging capability. A reactor trip and safety injection will occur. RXCPs will be stopped using the E-0 Foldout Page RXCP Trip Criteria when subcooling and SI injection capability conditions are satisfied. (NOTE: Event 7 involves NO SI Pumps running and no SI flow when SI flow should occur. Tripping RXCPs should NOT occur until after SI Pump B is started.) EAL escalation FA1, ALERT: Any Loss or any potential loss of either the fuel clad or RCS (Table F-1). Table F-1 Fission product barrier reference table: RCS Barrier, Potential Loss, RCS leak rate un-isolable > 60 gpm the capacity of charging pump in normal charging mode.
6	At the time of the reactor trip, Bus 5 will lockout due to ground fault. This will remove power from the Train A Safeguards (ECCS/ESF) equipment. DG A will start on the Safety Injection signal but will run with no cooling water supplied from Service Water System. The BOP operator will stop DG A and place its control switch in PULLOUT using ARP OP-KW-ARP-47091-G, Bus 5 Lockout, to prevent damage to DG A.

7	SI Pump B will fail to auto start on the Safety Injection. This will result NO SI Pumps running for the small break LOCA. The RO will start SI Pump B as directed in E-0 while performing ATTACHMENT A (NOTE: The step may be brought forward using guidance of UG-0 and started when the failure to run is noted.) The crew will continue the actions of E-0 to ensure Safeguards equipment is operating as required. Diagnosis will be made of an RCS leak and transition will be made to E-1. Termination of the scenario will be made in E-1 at the point the crew completes evaluation of SI Termination Criteria (SI cannot be terminated).

Facility: Kewaunee Power Station Scenario No.:2 Op-Test No.: 1

Examiners: ____________ Operators: SRO: SRO-I (1, 2, 4, 5)
ATC: RO- (3, 5, 2, 1)
BOP: SRO-I (8, 3,6, 7)

Initial Conditions: 100% power MOL Equilibrium Xenon. RCS boron concentration is 968 ppm. RCS Tave is 572ºF. Generator load is 601 MWe gross.

Turnover: Maintain 100% power. Equipment OOS: 1) T/D ADFW Pump for TD AFW pump: Auxiliary Lube Oil Pump Overhaul per CMP-05B-03.; 2) NI Channel N43 failed and removed from service per AOP-GEN-MISC-001 4 hours ago: 3)"B" EDG OOS for governor maintenance, 4) PR-1A closed maintaining power for PR-2A seat leakage TS 3.1.a.5.A.1, 5) Boric Acid Totalizer

Event No.	Malf. No.	Event Type*	Event Description
1	RX203 100%	I (RO)	Failure of Pressurizer Pressure Instrument, Controlling Channel (BLUE)
2		N	Load Reduction requested by ATC for Line Work
2		R	Power Reduction as requested by ATC
3	SW05A 99%	C (BOP)	SW pump 1A1 trip on over current
3	SW06D	C (BOP)	Failure to Auto Start SW pump 1B2
4	MS02A 0.1-.03% over 10 minutes	M (Both)	Main Steam Line Break Inside containment, Header "A"
5	RD11A	C (BOP)	Failure Train "A" Reactor Trip Breakers to Open
5	RD11B	C (BOP)	Failure Train "B" Reactor Trip Breakers to Open
6	FW16B	C (BOP)	Failure "B" AFW pump to Auto Start
7	CS03A	C (RO)	Failure to Auto Start ICS pump "A"
7	CS03B	C (RO)	Failure to Auto Start ICS pump "B"

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO 1-2 OVERVIEW

EVENT	DESCRIPTION
1	Controlling channel for PRZR pressure fails high, PT-431(Blue Channel). The failure will cause PRZR and RCS pressure to drop as PRZR heaters turn off and PRZR spray valves open (PS-1A & PS-1B). The RO will manually shut the spray valves per OP-KW-AOP-GEN-001, Immediate Operator Actions. The US will direct transition to OP-KW-AOP-MISC-001, Response To Instrument Failure. Per OP-KW-AOP-MISC-001 the RO will select an operable PRZR pressure channel for PRZR pressure control and input to the PRZR pressure recorder. The US will evaluate Technical Specifications (TS) and tripping bistables. TS for the plant transient are 3.10.l for RCS pressure and 3.10.n for DNBR parameters. TS for failed pressurizer pressure instrument PT-431 include table 3.5-2 item #5-OTΔT, table 3.5-2 item #7-Low Pressurizer Pressure, table 3.5-2 item #8-High Pressurizer Pressure, and table 3.5-3 item #1d-Pressurizer Low Pressure. All TS requirements for continued operation will be met.
2	ATC will call the control room requesting a 36 MWe back down (6%) in the next 90 minutes for emergent transmission line work on Q-303, Q-303 hot. The back down is to ensure post trip grid contingencies are met. The US will direct the back down per OP-KW-GOP-307 section 5.2. The RO will use NOP-CVC-001and N-CRD-49 to control reactivity as directed by the standard reactivity plan. The BOP will lower Turbine Load per N-TB-54.
3	After the 6% back down is complete, service water pump 1A1 will trip and service water pump 1B2 will fail to auto start. The BOP will manually start service water pump 1B2 per OP-KW-ARP-47051-P. After Completion of the ARP the crew will perform AOP-SW-001 to verify system operation. Per TS 3.7.c the crew identifies in TS 3.0.c for two trains of equipment listed in TRM 3.3.1 as OOS. TRM 3.3.1 when a train of service water is declared inoperable then the following administrative limiting conditions for operations apply: TS 3.3.e for an inoperable service water system, TS 3.7.b.2 for an inoperable emergency diesel generator, TS 3.3.d for an inoperable component cooling train, TS 3.3.b for an inoperable safety injection train, TS 3.3.c for an inoperable containment fan coil units train, TS 3.3.b for an inoperable residual heat removal train, and TS 3.4.b for an inoperable auxiliary feed water train. Three trains of AFW inoperable apply TS 3.4.b.2, when the Reactor Coolant Temperature is > 350^0F, if three auxiliary Feedwater trains are discovered to be inoperable, initiate immediate action to restore one auxiliary Feedwater train to operable status and suspend all Limiting Conditions For Operations requiring mode changes until one auxiliary Feedwater train is restored to operable status.

4	A small steam line break in containment will build over 10 minutes. Containment Pressure will slowly build to 3.6 psi causing a Reactor Trip and SI signal to be generated. The crew should decide to manually trip the reactor. TS 3.6.d, if the internal pressure of the reactor containment vessel exceeds 2 psi, the condition shall be corrected within 8 hours or the reactor shall be placed in a subcritical condition.
5	Automatic reactor trip will fail. The operators will attempt to manually trip the reactor with the push buttons on the control boards, this will fail. Rod insertion will be successful when the BOP de-energizes bus 33 and 43 from the control room. The break size will increase when rods are inserted. EAL Classification SA2.1 ALERT. Failure of reactor protection system instrumentation to complete or initiate an automatic reactor trip once a reactor protection system set point has been exceeded and a manual reactor trip was successful.
6	"B" AFW pump will fail to Auto Start. The BOP will have to manually start AFW pump "B" to establish AFW flow and isolate feed flow to the faulted SG "A"
7	Failure of ICS to initiate on Hi-Hi containment pressure. The RO will identify containment pressure greater than 23 psi (ICS set point) and ICS has failed to initiate. Manual Pushbuttons will not initiate ICS. The RO will have to perform ICS valve alignment and manually start ICS pumps per Attachment "A" of E-0. The crew will continue the actions of E-0 and upon a diagnosis of Faulted SG "A" transition to E-2. Termination of the scenario will be after the crew transitions from E-2 to E-1

Facility: Kewaunee Power Station Scenario No.:3 Op-Test No.: 1

Examiners: ____________________ Operators: SRO: SRO-I (1, 2, 4, surrogate)
____________________ ATC: SRO-I (8, 6, 3, 5)
____________________ BOP: RO-(3, 5, 2, 1)

Initial Conditions: 27.3% power, BOL, Plant Startup in Progress: 123MWe, 473MWt, 2242 ppm Boron, Tave 552.4^{0}F

Turnover: Chemistry Hold @ 30% Reactor Power: Step 5.2.18 of OP-KW-GOP-105. Equipment OOS: emergency Boric Acid Totalizer

Event No.	Malf. No.	Event Type*	Event Description
1	RC10B 10%	C (RO)	PR-2B Fails Open
2	RX213	I (BOP)	SG "A" pressure transmitter fails high
3	SG02A .3%	C (Both)	Small SG "A" tube leak < 1 gpm
		R (RO)	Reactor Shutdown
		N (BOP)	Plant Shutdown
4	SG01A 20%	M (Both)	SGTR "A" SG
5	MS08A	C (BOP)	Failure of MS-1A to Close
5	MS08B	C (BOP)	Failure of MS-1B to Close
6	Override	C (RO)	Failure of Spray Valve PS-1A to Operate
6	Override	C (RO)	Failure of Spray Valve PS-1B to Operate

* (N)ormal, (R)eactivity, (I)nstrument, (C)omponent, (M)ajor

SCENARIO 1-3 OVERVIEW

EVENT	DESCRIPTION
1	PRZR PORV (PR-2B) fails open at 10%. The RO will perform the immediate operator actions of OP-KW-AOP-GEN-001 to shut the PRZR PORV Block Valve (PR-1B) and PRZR PORV (PR-2B). TS for the plant transient are 3.10.l for RCS pressure and 3.10.n for DNBR parameters. TS 3.1.a.5.A.2 for the failed PRZR PORV: PORV inoperable for reasons other than seat leakage within one hour either restore the PORV to operable status or close the associated block valve and remove power from the block valve. Restore the PORV to operable status within 72 hours or action shall be initiated to achieve hot standby within 6 hours and hot shutdown within the following 6 hours. The crew will pursue opening the breaker for PR-1B while the scenario continues. EAL SU5.2
2	PT-468 “A” SG pressure transmitter fails high over 60 seconds. The “A” SG PORV will open and “A” SG level will rise above program level. The BOP will perform the immediate operator actions of OP-KW-AOP-GEN-001 and place FW-7A in manual and close SD-3A. After closure of the “A” SG PORV The US will direct entry into OP-KW-MISC-001, Response To Instrument Failure. The BOP will restore SG level to 44%, defeat the steam pressure instrument and return FW-7A to auto. FW-7A will be in automatic control prior to the next event.
3	SG “A” will develop a small tube leak of approximately 500 gpd (.35 gpm) over 5 minutes. The crew will diagnose the indications and determine that a rapid power reduction and plant shutdown is required per OP-KW-AOP-RC-004, SG Tube Leak. The US will coordinate the actions of OP-KW-AOP-GEN-002, Rapid Power Reduction to shut down the plant while implanting OP-KW-RC-004, SG Tube Leak. The RO will borate the RCS per OP-KW-AOP-GEN-002 during the power reduction. The BOP will perform turbine load reduction and shift 4160 VAC buses from the MAT to the RAT per N-EHV-39. TS 3.1.d.1.D for RCS operational leakage: When the average RCS temperature is > 250^{0}F Operational leakage shall be limited to 150 gallons per day primary to secondary leakage through any one steam generator. TS 3.1.d.3 If the limits contained in TS3.1.d.1 for pressure boundary or primary to secondary leakage are exceed. Or the time limit contained in TS 3.1.d.2 is exceeded, then initiate action to achieve hot shutdown within 6 hours and cold shutdown within an additional 30 hours.

4	After the BOP has shifted 4160V Buses from the MAT to the RAT, the SG "A" tube leak will develop into a SGTR. The SGTR will generate a Reactor Trip and SI signal. The US will direct entry into E-0. EAL classification FA1, ALERT: Any Loss or any potential loss of either the fuel clad or RCS (Table F-1). Table F-1 Fission product barrier reference table: RCS Barrier, Loss, SGTR that results in ECCS (SI) actuation.
5	The crew will perform the immediate actions of E-0. The RO will manually SI on decreasing PRZR level. The BOP will isolate feed to ruptured SG "A" either in E-0 or E-3 after SG "A" narrow range level is greater than 5%. The crew will progress through E-0 and transition to E-3. The MSIVs will fail to close during the steam isolation step of the ruptured SG "A" in E-3. Manual attempts to close MSIVs will also fail. The BOP will set Steam Dump manual controller (HC-484) to 1050 psig and steam dumps to steam pressure mode. Direction will be given to locally isolate main steam header. The US will direct the BOP to use the intact SG "B" PORV to control RCS temperature and cooldown. After determining that the ruptured SG "A" can not be isolated from the intact SG "B" a transition to ECA-3.1 will be made.
6	When required to depressurize to restore PRZR level in ECA-3.1 the spray valves will fail to operate and the crew will have to depressurize using a PRZR PORV The scenario will terminate after the crew has progressed in ECA-3.1 to the determination if one SI pump should be stopped.

Kewaunee Power Station

Random Generation Technique and K/A Suppression

Random Generation Technique

The technique for generating the written examination outline was similar to that described in NUREG-1021, Rev. 9, Supp. 1, ES-401 Attachment 1. The tokens used were numbered (poker) chips that corresponded to the topics and K/As available, as appropriate. One individual selected the chip, unseen from a basket, after scrambling of the chips was performed.

K/A Suppression

A review was made of applicable systems and systems 025, Ice Condenser, and 027, Containment Iodine Removal, were removed for selection since Kewaunee Power Station does not have these systems. Additionally, during system and EPE/APE selection, K/As with a value less than 2.5 were reviewed and rejected (not placed in the basket for selection), if it was determined that no plant specific priority existed for the item. The generic K/As that are NOT identified in NUREG-1021, Rev. 9, Supp. 1, ES-401 D.1.b for inclusion in the Tier 1 and Tier 2 selection, were excluded from the selection process. Additionally as the K/As identified in NUREG-1021, Rev. 9, Supp. 1, ES-401 D.1.b, “Single-unit facilities may also eliminate K/As 2.2.3 and 2.2.4,” were also excluded from the selection process.