

2009 Waterford RO / SRO Written Exam Analysis

RO
Exam

Applicant	A	B	C	D	E	F	G	H	I	J	% missed
1				1							10
2		1									10
3											0
4											0
5											0
6					1		1				20
7											0
8						1				1	20
9											0
10											0
11											0
12											0
13											0
14											0
15		1						1		1	30
16											0
17											0
18											0
19				1			1			1	30
20						1					10
21											0
22							1	1	1	1	40
23											0
24											0
25						1					10
26											0
27										1	10
28		1				1				1	30
29								1			10
30											0
31											0
32											0
33						1				1	20
34			1								10
35											0
36											0
37											0
38											0

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Applicant	A	B	C	D	E	F	G	H	I	J	% missed
39											0
40											0
41											0
42											0
43											0
44							1	1			20
45				1			1	1	1		40
46	1								1		20
47						1					10
48						1	1				20
49										1	10
50	1		1						1		30
51				1							10
52	1									1	20
53											0
54							1	1			10
55							1	1		1	30
56											0
57										1	10
58											0
59											0
60		1	1				1				30
61											0
62											0
63											0
64											0
65		1				1		1	1		40
66						1		1			20
67			1				1	1	1		40
68			1								10
69											0
70						1	1	1			10
71											20
72											0
73										1	10
74							1	1	1	1	40
75				1		1					20
Grade	96.00	93.33	93.33	93.33	98.67	85.33	85.33	84.00	90.67	82.67	

SRO
Exam

Applicant	A	B	C	D	E	% missed
1						0
2						0
3						0
4						0
5			1			20
6	1	1	1	1		80
7						0
8						0
9	1					20
10						0
11						0
12						0
13						0
14						0
15				1		20
16						0
17						0
18						0
19						0
20			1	1		40
21						0
22						0
23						0
24						0
25						0
Grade	92.00	96.00	88.00	88.00	100.00	

Over-all RO
& SRO

95.00 94.00 92.00 92.00 99.00

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Question SRO 6

The question was as follows:

The following plant conditions exist:

- The plant is in Mode 1
- The shift manager receives a call from the grid operator informing him that Waterford's post-trip grid voltage would be 222 kV, which is below the required value of TRM 3.8.1.1 for post-trip emergency loads
- Current grid voltages meet the requirements of OP-903-066, Electrical Breaker Alignment Check.

Based on this information, the crew should _____ (1) _____ because _____ (2) _____

- | | (1) | (2) |
|----|---|---|
| A. | declare both AC off-site circuits inoperable and enter both Tech Spec 3.8.1.1 and TRM 3.8.1.1 | sufficient margin does not exist to ensure offsite power would remain available for either safe shutdown of the facility or for the mitigation of any accidents. |
| B. | declare both AC off-site circuits inoperable and enter both Tech Spec 3.8.1.1 and TRM 3.8.1.1 | sufficient margin exists to ensure offsite power would remain available for safe shutdown of the facility, but not for the mitigation of any accidents. |
| C. | enter only TRM 3.8.1.1 | Sufficient margin exists to ensure offsite power would remain available for safe shutdown of the facility, but not for the mitigation of any accidents. |
| D. | enter only TRM 3.8.1.1 | Sufficient margin exists to ensure offsite power would remain available for operation of the emergency loads following a design basis accident. |

Results:

2 applicants choose A and 2 chose C. 1 applicant choose the correct answer, D.

Resolution:

The stem gave information that post trip grid voltage was forecast to be below the 222 KV required by TRM 3.8.1.1. Entering TRM 3.8.1.1 was not a decision point. TRM directs completing an offsite A.C. circuit operability determination within 12 hours. In the stem, it was given that the current grid voltages met the requirements of OP-903-066, Electrical Breaker Alignment Check. OP-903-066 is the surveillance that verifies Waterford's offsite A.C. circuit operability determination. This is information the applicant's should have known from memory, since there are several 1 hour Tech Spec situations that direct performing this surveillance.

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With the requirements of OP-903-066 met, Tech Spec 3.8.1.1 does not need to be entered. Selections A and B. are incorrect since Tech Spec 3.8.1.1 does not need to be entered.

The second decision point involved determining if the grid conditions ensured power existed to address accident conditions. The bases of TRM 3.8.1.1 describes:

In accordance with this procedure, the Grid Operator will notify Waterford 3 in the event that the predicted post-trip switchyard voltage reaches a value of 223kV (97% of 230kV). This value provides an alert to control room personnel of grid voltage approaching unacceptable levels. Sufficient margin exists between this value and the minimum acceptable value of approximately 220.8kV (96% of 230kV), which corresponds to the 4kV degraded voltage relay setpoint at 3875V, required to ensure offsite power would remain available for operation of the emergency loads following a design basis accident.

Selection C is incorrect because it states that there would not be enough margin for the mitigation of any accidents. The bases of Tech Spec 3.8.1.1 states:

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety related equipment required for (1) the safe shutdown of the facility and (2) the mitigation and control of accident conditions within the facility.

The correct answer, selection D, accurately describes the statements in the TRM.

10 CFR 55.43, item b.2, lists the facility operating limitations in the technical specifications and their bases as a required item for the SRO level.

Therefore, no change to SRO question 6 is necessary. This information will be shared with the LOI program lead so it can be covered with the applicants.

→(DRN 05-1013, Am. 103)

3/4.8 ELECTRICAL POWER SYSTEMS

3/4.8.1 A.C. SOURCES

OPERATING

LIMITING CONDITION FOR OPERATION

3.8.1.1 Offsite A.C. circuit voltage, as measured at the Waterford 3 Switchyard, shall be such that predicted post-trip offsite A.C. circuit voltage, as determined by the Grid Operator, will be sufficient to supply post-trip emergency loads.

APPLICABILITY: MODE 1

ACTIONS:

- a. When notified by the Grid Operator that predicted post-trip offsite A.C. circuit voltage will be less than 223kV, initiate a Condition Report and complete an offsite A.C. circuit operability determination within 12 hours.

SURVEILLANCE REQUIREMENTS:

None

←(DRN 05-1013, Am. 103)

→ (DRN 05-1013, Am. 103)

← (DRN 05-1013, Am. 103)

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

3/4.8.1, 3/4.8.2, and 3/4.8.3 A.C. SOURCES, D.C SOURCES, and ONSITE POWER DISTRIBUTION SYSTEMS

The OPERABILITY of the A.C. and D.C. power sources and associated distribution systems during operation ensures that sufficient power will be available to supply the safety-related equipment required for (1) the safe shutdown of the facility and (2) the mitigation and control of accident conditions within the facility. The minimum specified independent and redundant A.C. and D.C. power sources and distribution systems satisfy the requirements of General Design Criterion 17 of Appendix A to 10 CFR Part 50.

→(DRN 04-1243, Ch. 38; EC-1735, Ch. 55; EC-10725, Ch. 56)

←(DRN 04-1243, Ch. 38; EC-1735, Ch. 55; EC-10725, Ch. 56)

The ACTION requirements specified for the levels of degradation of the power sources provide restriction upon continued facility operation commensurate with the level of degradation. The OPERABILITY of the power sources are consistent with the initial condition assumptions of the safety analyses and are based upon maintaining at least one redundant set of onsite A.C. and D.C. power sources and associated distribution systems OPERABLE during accident conditions coincident with an assumed loss-of-offsite power and single failure of the other onsite A.C. source. When one diesel generator is inoperable to perform either preplanned maintenance (both preventive and corrective) or unplanned corrective maintenance work, the allowed-outage-time (AOT) can be extended from 72 hours to 10 days, if a temporary emergency diesel generator (TEDG) is verified available and aligned for backup operation to the permanent plant EDG removed from service. The TEDG will be available prior to removing the permanent plant EDG from service for the extended preplanned maintenance work or prior to exceeding the 72-hour AOT for the extended unplanned corrective maintenance work. A Configuration Risk Management Program (CRMP) is implemented to assess risk of this activity when applying this ACTION. The TEDG availability is verified by: (1) starting the TEDG and verifying proper operation; (2) verifying 24 hour onsite fuel supply; and (3) ensuring the TEDG is aligned to supply power through a 4.16 kV non-safety bus to the 4.16kV safety bus. A status check for TEDG availability will also be performed at least once every 72 hours following the initial TEDG availability verification. The status check shall consists of: (1) verifying the TEDG equipment is mechanically and electrically ready for manual operation; (2) verifying 24 hour onsite fuel supply; and (3) ensuring the TEDG is aligned to supply power through a 4.16 kV non-safety bus to the 4.16 kV safety bus. If the TEDG becomes unavailable during the 10 day AOT and cannot be restored to available status, the EDG AOT reverts back to 72-hours. The 72 hours begins with the discovery of the TEDG unavailability, not to exceed a total of 10 days from the time the EDG originally became inoperable. The A.C. and D.C. source allowable out-of-service times are based on Regulatory Guide 1.93, "Availability of Electrical Power Sources," December 1974. When one diesel generator is inoperable, there is an additional ACTION requirement to verify that all required systems, subsystems, trains, components, and devices that depend on the remaining OPERABLE diesel generator as a source of emergency power are also OPERABLE, and that the steam-driven auxiliary feedwater pump is OPERABLE. This requirement is intended to provide assurance that a loss-of-offsite power event will not result in a complete loss of safety function of critical systems during the period one of the diesel generators is inoperable. The term verify as used in this context means to administratively check by examining logs or other information to determine if certain components are out-of-service for maintenance or other reasons. It does not mean to perform the Surveillance Requirements needed to demonstrate the OPERABILITY of the component.

→(DRN 05-1013, Am. 103)

3/4.8 ELECTRICAL POWER SYSTEMS

BASES

→(DRN 07-136, Am. 111)

3/4.8.1, 3/4.8.2 A.C. SOURCES (Continued)

←(DRN 07-136, Am. 111)

At present, periodic studies are generally performed for Waterford 3 on a 2-3 year interval to project that transmission system voltages will remain stable and within the Waterford 3 operating requirements, under certain contingencies, over the upcoming period. Also daily studies to project post trip voltages are performed for the next day using daily cases representing that day of the month. These studies are updated during the following day if transmission system elements that could affect Waterford 3 post-trip voltages are lost. If a situation is encountered that would result in inadequate switchyard post-trip voltages, the Waterford 3 operating staff will be made aware of the condition.

Additional information regarding double sequencing and grid stability can be found in Section 2.3.6, "Three-Second Time Delay Between Steam Generator Tube Rupture and Loss-of-Offsite Power," of the Safety Evaluation for License Amendment 199 approved and issued by the NRC on April 15, 2005. Reference: regulatory commitment A-26779 in Commitment Management System.

→(DRN 07-136, Am. 111)

The EDG manufacturer's recommended inspection surveillance requirements (SR) were relocated from TS 4.8.1.1.2.f to the TRM. The SR relocation was evaluated against the four criterion of 10 CFR 50.36, Technical Specifications (TS), and determined the SR could be deleted from TS. The performance of the vendor recommended inspections do not impact the ability of the EDG to perform its safety function, therefore, these inspections do not impact the systems capability of mitigating a design basis accident or transient that either assumes the failure of or presents a challenge to the integrity of a fission product barrier.

Limiting Condition for Operations

The purpose of Offsite A.C. circuit voltage requirement is to ensure that post-trip switchyard voltages will be sufficient to operate emergency loads. Per Nuclear Management Manual Procedure ENS-DC-201, "ENS Transmission Grid Monitoring," the Grid Operator will predict switchyard voltages resulting from a Waterford 3 trip based on actual grid conditions. In accordance with this procedure, the Grid Operator will notify Waterford 3 in the event that the predicted post-trip switchyard voltage reaches a value of 223kV (97% of 230kV). This value provides an alert to control room personnel of grid voltage approaching unacceptable levels. Sufficient margin exists between this value and the minimum acceptable value of approximately 220.8kV (96% of 230kV), which corresponds to the 4kV degraded voltage relay setpoint at 3875V, required to ensure offsite power would remain available for operation of the emergency loads following a design basis accident.

←(DRN 05-1013, 07-136 Am. 111)

→(DRN 05-1013, 07-136 Am. 111)

←(DRN 05-1013, 07-136 Am. 111)