

ANO Unit Two 2002 RO Examination Outline

Based on NUREG-1021

Form ES-401-4

Pg 33 of 46

Rev.8 Supplement 1

| | | K/A Category Points | | | | | | | | | | | |
|--------------------------------------|--------------------|----------------------------|-------------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|--------------------|
| Tier | Group | | | | | | | | | | | | Point Total |
| | | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | |
| Tier 1 Plant Evolutions | 1 | 3 | 3 | 3 | | | | 3 | 3 | | | 1 | 16 |
| | 2 | 3 | 3 | 3 | | | | 3 | 3 | | | 2 | 17 |
| | 3 | 1 | 0 | 1 | | | | 1 | 0 | | | 0 | 3 |
| | Tier Totals | 7 | 6 | 7 | | | | 7 | 6 | | | 3 | 36 |
| Tier 2 Plant Systems | 1 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 23 |
| | 2 | 1 | 3 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 20 |
| | 3 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 2 | 0 | 8 |
| | Tier Totals | 5 | 5 | 5 | 4 | 5 | 4 | 3 | 5 | 5 | 6 | 4 | 51 |
| Tier 3 Generic | Cat1 | Cat2 | Cat3 | Cat4 | | | | | | | | | |
| | 4 | 4 | 2 | 3 | | | | | | | | | 13 |

| <i>Temp Total</i> | <i>Average</i> | <i>Std. Dev.</i> |
|-------------------|----------------|------------------|
| 16 | | |
| 17 | | |
| 3 | | |
| 36 | 6.00 | 1.55 |
| 23 | | |
| 20 | | |
| 8 | | |
| 51 | 4.64 | 0.81 |
| 13 | | |
| 100 | 9.09 | 4.89 |

| | | | | | | | | | | | | |
|----------------------|----|----|----|---|---|---|----|----|---|---|----|-----|
| K/A/G/ Totals | 12 | 11 | 12 | 4 | 5 | 4 | 10 | 11 | 5 | 6 | 20 | 100 |
|----------------------|----|----|----|---|---|---|----|----|---|---|----|-----|

ANO Unit 2 2002 RO Examination Outline

Emergency and Abnormal Plant Evolutions - Tier 1/Group 2

| E/APE # / Name / Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Points |
|---|----------|----------|----------|----------|----------|----------|--|----------------------------|-----------|
| 000001 Continuous Rod Withdrawal / 1 | | | | | | | Not Selected | | 0 |
| 000003 Dropped Control Rod / 1 | 1 | | | | | | 003 AK1.10 - Knowledge of the operational implications of the definitions of core quadrant tilt as they apply to Dropped Control Rod. (QID 0324) | 2.6 | 1 |
| 000007 Reactor Trip - Stabilization / 1 | 1 | | | | | | 007 EK1.06 - Knowledge of the operational implications of the relationship of emergency feedwater flow to S/G and decay heat removal following reactor trip. (QID 0325) | 3.7 | 1 |
| CE/E02 Reactor Trip Recovery / 1 | | | | | | | Not Selected | | |
| BW/A01 Plant Runback / 1 | | | | | | | Not Applicable | | 0 |
| BW/A04 Turbine Trip / 4 | | | | | | | Not Applicable | | 0 |
| 000008 Pressurizer Vapor Space Accident / 3 | | 1 | | | | | 008 AK2.02 - Knowledge of the interrelations between the Pressurizer Vapor Space Accident and the sensors & detectors. (QID 0326) | 2.7 | 1 |
| 000009 Small Break LOCA / 3 | | | | 1 | | | 009 EA1.16 - Ability to operate and monitor Subcooling margin monitors as they apply to a Small Break LOCA. (QID 0327) | 4.2 | 1 |
| 000011 Large Break LOCA / 3 | | 1 | | | | | 011 EK2.02 - Knowledge of the interrelations between the pumps and Large Break LOCA. (QID 0328) | 2.6 | 1 |
| WE04 LOCA Outside Containment / 3 | | | | | | | Not applicable. | | 0 |
| BW/E08; WE03 LOCA Cooldown/Depress. / 4 | | | | | | | Not applicable. | | 0 |
| WE11 Loss of Emergency Coolant Recirc. / 4 | | | | | | | Not applicable. | | 0 |
| WE01 & E02 Rediagnosis & SI Termination / 3 | | | | | | | Not applicable. | | 0 |
| 000022 Loss of Reactor Coolant Makeup / 2 | | | | 1 | | | 022 AA1.08 - Ability to operate and/or monitor VCT level as it applies to the Loss of Reactor Coolant Makeup. (QID 0329) | 3.4 | 1 |
| 000025 Loss of RHR System / 4 | | | | | 1 | | 025 AA2.04 - Ability to determine and interpret the location and isolability of leaks as they apply to the Loss of Residual Heat Removal System. (QID 0433) | 3.3 | 1 |
| 000029 Anticipated Transient w/o Scram / 1 | | | 1 | | | | 029 EK3.11 - Knowledge of the reasons for initiating emergency boration as they apply to ATWS. (QID 0331) | 4.2 | 1 |
| 000032 Loss of Source Range NI / 7 | | | | | | | Not applicable. | | 0 |
| 000033 Loss of Intermediate Range NI / 7 | | | | | | | Not applicable. | | 0 |
| 000037 Steam Generator Tube Leak / 3 | | | | | | 1 | Generic 2.4.11 - Knowledge of Steam Generator Tube Leak abnormal condition procedures. (QID 0332) | 3.4 | 1 |
| 000038 Steam Generator Tube Rupture / 3 | | | | | 1 | | 038 EA2.08 - Ability to determine viable alternatives for placing plant in safe condition when condenser is not available when SGTR present. (QID 00434) | 3.8 | 1 |
| 000054 Loss of Main Feedwater / 4 | | | 1 | | | | 054 AK3.04 - Knowledge of the reasons for the following actions contained in the EOPs for Loss of MFW. (QID 0334) | 4.4 | 1 |
| CE/E06 Loss of Main Feedwater / 4 | | | | 1 | | | CE/E06 EA1.2 - Ability to operate and/or monitor Operating behavior characteristics of the facility as they apply to Loss of Feedwater. (QID 0335) | 3.4 | 1 |
| BW/E04; WE05 Inadequate Heat Transfer - Loss of Secondary Heat Sink / 4 | | | | | | | Not applicable. | | 0 |
| 000058 Loss of DC Power / 6 | | | 1 | | | | 058 AK3.01 - Knowledge of the reasons for use of DC control power by D/Gs as they apply to the Loss of DC Power. (QID 0336) | 3.4 | 1 |
| 000059 Accidental Liquid Radwaste Rel. / 9 | | | | | 1 | | 059 AA2.04 - Ability to determine and interpret the valve lineup for a release of radioactive fluid as they apply to the Accidental Liquid Radwaste Release. (QID 0435) | 3.2 | 1 |
| 000060 Accidental Gaseous Radwaste Rel. / 9 | | | | | | 1 | Generic 2.4.10 - Knowledge of annunciator response procedures associated with an accidental gaseous radwaste release. (QID 0338) | 3.0 | 1 |
| 000061 ARM System Alarms / 7 | | 1 | | | | | 061 AK2.01 - Knowledge of the interrelations between the Area Radiation Monitoring (ARM) System Alarms and the detectors at each ARM location. (QID 0339) | 2.5 | 1 |
| WE16 High Containment Radiation / 9 | | | | | | | Not applicable. | | 0 |
| CE/E09 Functional Recovery | 1 | | | | | | CE/E09 EK1.2 - Knowledge of the operational implications of normal, abnormal and emergency procedures associated with Functional Recovery. (QID 0340) | 3.2 | 1 |
| K/A Category Totals: | 3 | 3 | 3 | 3 | 3 | 2 | | Group Point Total = | 17 |

ANO Unit 2 2002 RO Examination Outline
Emergency and Abnormal Plant Evolutions - Tier 1/Group 3

| E/APE # / Name / Safety Function | K1 | K2 | K3 | A1 | A2 | G | K/A Topic(s) | Imp. | Points |
|--|----|----|----|----|----|---|--|-----------------------|--------|
| 000028 Pressurizer Level Malfunction / 2 | | | | 1 | | | 028 AA1.07 - Ability to operate and/or monitor charging pumps in maintenance of PZR level (including manual backup) as applied to the Pressurizer Level Control Malfunctions. (QID 0341) | 3.3 | 1 |
| 000036 Fuel Handling Accident / 8 | | | | | | | Not Selected | | 0 |
| 000056 Loss of Off-site Power / 6 | 1 | | | | | | 056 AK1.01 - Knowledge of the operational implications of the principle of cooling by natural convection. (QID 0342) | 3.7 | 1 |
| 000065 Loss of Instrument Air / 8 | | | 1 | | | | 065 AK3.04 - Knowledge of the reasons for cross-over to backup air supplies as they apply to the Loss of Instrument Air. (QID 0343) | 3.0 | 1 |
| BW/E13&E14 EOP Rules and Enclosures | | | | | | | Not applicable. | | 0 |
| BW/A05 Emergency Diesel Actuation / 6 | | | | | | | Not applicable. | | 0 |
| BW/A07 Flooding / 8 | | | | | | | Not applicable. | | 0 |
| CE/A16 Excess RCS Leakage / 2 | | | | | | | Not Selected | | 0 |
| W/E13 Steam Generator Over-pressure / 4 | | | | | | | Not applicable. | | 0 |
| W/E15 Containment Flooding / 5 | | | | | | | Not applicable. | | 0 |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| K/A Category Totals: | 1 | 0 | 1 | 1 | 0 | 0 | | Group Point Total = 3 | 3 |

ANO Unit 2 2002 RO Examination Outline

Plant Systems - Tier 2/Group 2

| System # / Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic | Imp. | Points |
|----------------------------------|----|----|----|----|----|----|----|----|----|----|---|--|------------------------|--------|
| 002 Reactor Coolant | | | | | | | | | | | 1 | Generic 2.1.32 - Ability to explain and apply all system limits and precautions. (QID 0367) | 3.4 | 1 |
| 006 Emergency Core Cooling | | | | | | | | | | | 1 | 006 A4.03 - Ability to operate and/or monitor in the control room transfer from boron storage tank to boron injection tank. (QID 0368) | 3.5 | 1 |
| 010 Pressurizer Press Control | | 1 | | | | | | | | | | 010 K2.02 - Knowledge of bus power supplies to the controller for PZR spray valve. (QID 0369) | 2.5 | 1 |
| 010 Pressurizer Press Control | | | | | | 1 | | | | | | 010 K6.03 - Knowledge of the effect of a loss or malfunction of the PZR sprays and heaters will have on the PZR Pressure Control System. (QID 0370) | 3.2 | 1 |
| 011 Pressurizer Level Control | | 1 | | | | | | | | | | 011 K2.02 - Knowledge of bus power supplies to the PZR heaters. (QID 0371) | 3.1 | 1 |
| 012 Reactor Protection | | | | | | 1 | | | | | | 012 K6.01 - Knowledge of the effect of a loss or malfunction of bistables and bistable test equipment will have on the RPS. (QID 0372) | 2.8 | 1 |
| 014 Rod Position Indication | | | | | 1 | | | | | | | 014 K5.01 - Knowledge of the operational implications of the reasons for differences between Rod Position Indication System and step counter. (QID 0373) | 2.7 | 1 |
| 016 Non-nuclear Instrument | | | | | | | | | | | | Not Applicable | | 0 |
| 026 Containment Spray | 1 | | | | | | | | | | | 026 K1.01 - Knowledge of the physical connections and/or cause-effect relationships between the Containment Spray System and the ECCS. (QID 0374) | 4.2 | 1 |
| 029 Containment Purge | | 1 | | | | | | | | | | 029 K1.03 - Knowledge of the physical connections and/or cause-effect relationships between the Containment Purge System and Engineered Safeguards System. (QID 0219) | 3.6 | 1 |
| 033 Spent Fuel Pool Cooling | | | | | | | | 1 | | | | 033 A2.03 - Ability to (a) predict the impacts of abnormal SFP water level or loss of water level on the Spent Fuel Pool Cooling System and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations. (QID 0300) | 3.1 | 1 |
| 035 Steam Generator | | | | | | | | | | | 1 | Generic 2.1.12 - Ability to apply technical specifications for the Steam Generator System. (QID 0377) | 2.9 | 1 |
| 039 Main and Reheat Steam | | | | | | | | | 1 | | | 039 A3.02 - Ability to monitor automatic operation of the Main/Reheat Steam System, including isolation of the M/R Steam System. (QID 0378) | 3.1 | 1 |
| 055 Condenser Air Removal | | | 1 | | | | | | | | | 055 K3.01 - Knowledge of the effect that a loss or malfunction of the Condenser Air Removal System will have on the main condenser. (QID 0379) | 2.5 | 1 |
| 062 AC Electrical Distribution | | | | | | | 1 | | | | | 062 A1.03 - Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the AC Distribution System controls including the effect on instrumentation and controls of switching power supplies. (QID 0380) | 2.5 | 1 |
| 063 DC Electrical Distribution | | | 1 | | | | | | | | | 063 K3.01 - Knowledge of the effect that a loss or malfunction of the DC electrical system will have on the EDG. (QID 0381) | 3.7 | 1 |
| 064 Emerg Diesel Generator | | | | | | | | | 1 | | | 064 A3.07 - Ability to monitor automatic operation of the EDG system, including load sequencing. (QID 0382) | 3.6 | 1 |
| 073 Process Radiation Monitoring | | | | | 1 | | | | | | | 073 K5.01 - Knowledge of the operational implications of radiation theory, including sources, types, units and effects as they apply to the Process Radiation Monitoring System. (QID 0383) | 2.5 | 1 |
| 075 Circulating Water | | | | 1 | | | | | | | | 075 K4.01 - Knowledge of Circulating Water System design feature(s) and interlock(s) which provide for heat sink. (QID 0384) | 2.5 | 1 |
| 079 Station Air | | | | | | | | 1 | | | | 079 K4.01 - Deselected - Use Plant Specific Priorities QID 0385 in Tier 2 Group 3. | 3.1 | 1 |
| 086 Fire Protection | | | | | | | | | | 1 | | 086 A4.02 - Ability to manually operate and/or monitor in the control room the fire detection panels. (QID 0386) | 3.3 | 1 |
| | | | | | | | | | | | | | | |
| K/A Category Totals: | 1 | 3 | 2 | 1 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | | Group Point Total = 20 | |

ANO Unit 2 2002 RO Examination Outline

Plant Systems - Tier 2/Group 3

| System # / Name | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic | Imp. | Points |
|------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|--|------------------------------|--------|
| 005 Residual Heat Removal | | | | | 1 | | | | | | | 005 K5.02 - Knowledge of the operational implications of the need for adequate subcooling as they apply to the Residual Heat Removal System. (QID 0387) | 3.4 | 1 |
| 007 Pressurizer Relief/Quench Tank | 1 | | | | | | | | | | | 007 K1.03 - Knowledge of the physical connections and/or cause-effect relationships between the Quench Tank System and the RCS. (QID 0388) | 3 | 1 |
| 008 Component Cooling Water | | | | | | | | | | | | Not selected | | 0 |
| 027 Containment Iodine Removal | | | | | | | | | | | | Not selected | | 0 |
| 028 Hydrogen Recomb/ Purge Control | | | | | | | | | | | 1 | 028 A4.01 - Ability to manually operate and/or monitor in the control room the Hydrogen Recombiner and Purge Control System controls. (QID 0389) | 4 | 1 |
| 034 Fuel Handling Equipment | | | | | | | | | | | 1 | 034 A4.02 - Ability to manually operate and/or monitor neutron levels in the control room during refueling operations (QID 0390) | 3.5 | 1 |
| 041 Stm Dump/Turb Bypass Control | | | 1 | | | | | | | | | 041 K3.01 - Knowledge of the effect that a loss or malfunction of the Steam Dump System will have on SGs. (QID 0391) | 3.2 | 1 |
| 045 Main Turbine Generator | | | | | | | | | | | 1 | 045 A2.08 - Ability to (a) predict the impacts of steam dumps not cycling properly at low load, or stick open at higher load (isolate and use atmospheric reliefs when necessary) on MTG system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations. (QID 0392) | 2.8 | 1 |
| 076 Service Water | | | | | | | | | | | | Not selected | | 0 |
| 078 Instrument Air | | | | | | | | | | | 1 | 078 A3.01 - Ability to monitor automatic operation of the Instrument Air System including air pressure. (QID 0393) | 3.1 | 1 |
| 103 Containment | | | | 1 | | | | | | | | 103 K4.06 - Knowledge of containment system design feature(s) and/or interlock(s) which provide for the containment isolation system. (QID 0394) | 3.1 | 1 |
| | | | | | | | | | | | | | | 0 |
| K/A Category Totals: | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 2 | | Group Point Total = 8 | |

Plant-Specific Priorities

| System/Topic | Recommended Replacement for..... | Reason | Points |
|--|-----------------------------------|---|----------|
| 064 Emergency Diesel Generators | 079 Station Air in Tier 2 Group 2 | 064 A2.09 Ability to predict the impact of a malfunction of the EDG System during synchronizing an EDG with other electric power supplies and based on those predictions, use procedures to correct, control or mitigate the consequences of the malfunction or operation. Condition reports ANO-2-2001 0158 and 0491 document a condition whereby the number 1 EDG was declared inoperable during an attempt to tie the diesel to offsite power during a surveillance. (Refer to the references in the question) This is a much higher plant priority than the randomly selected Station Air K&A 079 K4.01 (Tier 2 Group2) especially since the Station Air System crossconnect to the Instrument Air system is a manual valve. QID 0385 | 1 |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| Plant-Specific Priority Total: (limit 10) | 1 | | 1 |

Based on NUREG 1021 Rev. 8 Supplement 1 Form ES-401-5

| Facility: ANO - Unit 2 | | Date of Exam: 02/08/02 | Exam Level: RO | |
|-----------------------------|--------|--|----------------|--------|
| Category | K/A # | Topic | Imp. | Points |
| Conduct of Operations | 2.1.17 | Ability to make accurate, clear and concise verbal reports. (QID 0395) | 3.5 | 1 |
| | 2.1.22 | Ability to determine Mode of Operations. (QID 0396) | 2.8 | 1 |
| | 2.1.12 | Ability to apply technical specifications for a system. (QID 0397) | 2.9 | 1 |
| | 2.1.32 | Ability to explain and apply all system limits and precautions. (QID 0398) | 3.4 | 1 |
| | 2.1. | | | |
| | 2.1. | | | |
| Total | | | | 4 |
| Equipment Control | 2.2.27 | Knowledge of the refueling process (QID 0399) | 2.6 | 1 |
| | 2.2.2 | Ability to manipulate the console controls as required to operate the facility between shutdown and designated power levels. (QID 0400) | 4.0 | 1 |
| | 2.2.33 | Knowledge of control rod programming. (QID 0401) | 2.5 | 1 |
| | 2.2.11 | Knowledge of the process for controlling temporary changes. (QID 0037) | 2.5 | 1 |
| | 2.2. | | | |
| | 2.2. | | | |
| Total | | | | 4 |
| Radiation Control | 2.3.10 | Ability to perform procedures to reduce excessive levels of radiation and guard against personnel exposure. (QID 0161) | 2.9 | 1 |
| | 2.3.2 | Knowledge of facility ALARA program. (QID 0404) | 2.5 | 1 |
| | 2.3. | | | |
| | 2.3. | | | |
| | 2.3. | | | |
| | 2.3. | | | |
| Total | | | | 2 |
| Emergency Procedures / Plan | 2.4.31 | Knowledge of annunciator alarms and indications, and use of the response instructions. (QID 0405) | 3.3 | 1 |
| | 2.4.19 | Knowledge of EOP layout, symbols, and icons. (QID 0406) | 2.7 | 1 |
| | 2.4.15 | Knowledge of communications procedures associated with EOP Implementation. (QID 0407) | 3.0 | 1 |
| | 2.4. | | | |
| | 2.4. | | | |
| | 2.4. | | | |
| Total | | | | 3 |
| Tier 3 Point Total (RO) | | | | 13 |