

Here are the changes requested upon the initial review. I will determine if more changes are required as I develop exam questions. The password is the same as before.

PVNGS Draft Outline Comments (completed 9/13/04)  
Changes marked in red and line outs

### Operating Exam

1. ~~The outline only shows one JPM as a repeat—Emergency/Abnormal Plant Evolutions (EAPE) Item 3, A032 Loss of a Startup Channel During Refueling@ from the 2002 exam. However~~ **EAPE Item 1 (loss of inventory in the refuel pool) could possibly be similar to JPM B4 from the 2002 exam which dealt with loss of spent fuel pool level. I need to check this JPM once the exam comes in for review.** This JPM is significantly different from the previous JPM given in 2002. (Completed)
2. ~~Need K/A numbers for Systems and EAPE JPMs and importance ratings for all JPMs. Completed on 9/9/04, when Phil sent in completed written and operating outline. Discussed this with him verbally.~~ (Completed)

### Written Exam

3. Reviewed the licensee random and systematic process for selecting K/As and I followed this up with a phone conversation. I have no concerns with their selection process. Ensured that their selection process was random and systematic all the way to the actual K/A selection.
4. ~~Under the heading K/A Topic(s), include a short written description of the K/A.~~ (Completed)
5. ~~For Tier 2—K/A 034A1.02 similar to K/A 002A1.11—> both deal with inventory loss. Need to review questions for these two K/As to ensure not oversampling. 002A1.11 rejected and resampled within the same system. 034A1.02 rejected and resampled within same system. (Also, this is the same as item 6.b below)~~ (Completed)
6. Possible duplication between written and operating outlines as follows:
  - a) ~~JPM EAPE #3 (K/A 032AA2.02), loss of startup channel during refueling and written outline Tier 1, K/A 032AK3.02, guidance contained in EOP for loss of source range nuclear instrumentation. 032AK3.02 rejected and resampled within SR NI system.~~ (Completed)
  - b) ~~JPM EAPE #1 (K/A 025AA1.02), loss of SDC—loss of inventory in refuel pool and written outline K/A 034A1.02 similar to K/A 002A1.11—> both deal with inventory loss. Recommend changing one of the written K/As or the JPM. Oversampling on dealing with loss of inventory. 002A1.11 rejected and resampled within the same system.~~(Completed)

(Changed 034 Fuel Handling Equipment from A1.02 to A1.01, load limit KA)

7. Rejected a previous outline KA (Tier 2, [32002A1.11](#)) as not being applicable to the LSRO Job Function and replaced with [32002K6.14](#). This was discussed via telecom with Mark Haire on 10/01/04.
8. Rejected a previous outline KA (Tier 1, [42032AK3.02](#)). There is no EOP/AOP guidance for loss of SR NI. Another KA was randomly sampled from within the same system. ([42032AK201](#)). Reviewed with Mark Haire on site the week of 11/30/04.

| Facility: PVNGS Units 1,2,3                       |    |    |    |    |    |    | Date of Exam: 12/13/04 – 12/16/04 |    |     |    |    |       |  |
|---|----|----|----|----|----|----|-----------------------------------|----|-----|----|----|-------|--|
| K/A Category Points                               |    |    |    |    |    |    |                                   |    |     |    |    |       |  |
| Tier  | K1 | K2 | K3 | K4 | K5 | K6 | A1                                | A2 | A3  | A4 | G* | Total |  |
| 1.<br>Emergency &<br>Abnormal Plant<br>Evolutions | 1  | 2  | 1  |    |    |    | 2                                 | 2  |     |    | 2  | 10    |  |
| 2.<br>Plant<br>Systems                            | 2  | 2  | 2  | 2  | 1  | 1  | 2                                 | 2  | 2   | 2  | 2  | 20    |  |
| 3. Generic Knowledge and<br>Abilities Categories  | 1  |    | 2  |    | 3  |    | 4                                 |    | GFE |    |    | 10    |  |
|   | 2  |    | 2  |    | 2  |    | 2                                 |    | 2   |    |    |       |  |

- Note: 1. Ensure that at least one topic from every K/A category is sampled within each tier.
2. The point total for each tier in the proposed outline must match that specified in the table.  
The final point total for each tier may deviate by  $\pm 1$  from that specified in the table based on NRC revisions. The final exam must total 40 points.
3. Select topics from many systems and evolutions; avoid selecting more than two K/A topics from a given system (except fuel handling equipment) or evolution (except refueling accident).
4. The shaded areas are not applicable to the category/tier.
- 5.\* 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.
6. If the applicants have not previously taken the GFE, Tier 3 shall include basic reactor theory, component, and thermodynamic topics that apply to fuel handling operations.
7. Systems/evolutions within each tier are identified on the associated outline. Enter the K/A numbers, a brief description of each topic, the topics' importance ratings (IR) for the SRO license level, and the point totals (#) for each system and category. Enter the tier totals for each category in the table above.
8. For Tier 3, select topics from Section 2 of the K/A catalog, and enter the K/A numbers, descriptions, importance ratings, and point totals (#) on Form ES-701-3.
9. Refer to ES-401, Attachment 2, for guidance regarding the elimination of inappropriate K/A statements. The facility licensee's JTA for fuel handlers should be used as the basis for eliminating or adding testable topics.

| ES-701     |  | LSRO PWR Written Examination Outline Emergency and Abnormal Plant Evolutions -Tier 1 |    |    |    |    |   |   | Form ES-701-2 |    |
|------------|--|--|----|----|----|----|---|---|---------------|----|
| Question # |  | K1   | K2 | K3 | A1 | A2 | G | K/A Topic(s)  | IR            | #  |
| 1          | 000025 Loss of RHR Sys                 |  |    |    |    |    | X | 2.4.15 Knowledge of communications procedures associated with EOP implementation.   | 3.5           | 1  |
| 2          | 000026 Loss of Component Cooling Water |  |    |    | X  |    |   | AA1.03 Ability to operate and / or monitor the following as they apply to the Loss of Component Cooling Water: SWS as a backup to the CCWS  | 3.6           | 1  |
| 3          | 000032 Loss of Source Range NI         |  | X  |    |    |    |   | AK2.01 Knowledge of the interrelations between the Loss of Source Range Nuclear Instrumentation and the following: Power supplies, including proper switch positions.   | 3.1           | 1  |
| 4          | 000036 (BW/A08) Fuel Handling Accident |  |    |    |    | X  |   | AA2.02 Ability to determine and interpret the following as they apply to the Fuel Handling Incidents: Occurrence of a fuel handling incident  | 4.1           | 1  |
| 5          | 000061 ARM System Alarms               |  |    |    | X  |    |   | AA1.01 Ability to operate and / or monitor the following as they apply to the Area Radiation Monitoring (ARM) System Alarms: Automatic actuation  | 3.6           | 1  |
|            | 000033 Loss of Intermediate Range NI   |  |    |    |    |    |   |   |               |    |
|            | 000055 Station Blackout                |  |    |    |    |    |   |   |               |    |
| 6          | 000056 Loss of Offsite Power           |  |    |    |    | X  |   | AA2.08 Ability to determine and interpret the following as they apply to the Loss of Offsite Power: Operational status of fuel-handling building exhaust fan  | 2.3*          | 1  |
|            | 000057 Loss of Vital AC Inst. Bus      |  |    |    |    |    |   |   |               |    |
| 7          | 000058 Loss of DC Power                | X  |    |    |    |    |   | AK1.01 Knowledge of the operational implications of the following concepts as they apply to Loss of DC Power: Battery charger equipment and instrumentation   | 3.1           | 1  |
| 8          | 000062 Loss of Nuclear Svc Water       |  |    | X  |    |    |   | AK3.02 Knowledge of the reasons for the following responses as they apply to the Loss of Nuclear Service Water: The automatic actions (alignments) within the nuclear service water resulting from the actuation of the ESFAS | 3.9           | 1  |
| 9          | 000065 Loss of Instrument Air          |  |    |    |    |    | X | 2.1.27 Knowledge of system purpose and or function.   | 2.9           | 1  |
|            | 000067 Plant Fire On Site              |  |    |    |    |    |   |   |               |    |
| 10         | 000069 (W/E14) Loss of CTMT Integrity  |  | X  |    |    |    |   | AK2.03 Knowledge of the interrelations between the Loss of Containment Integrity and the following: Personnel access hatch and emergency access hatch   | 2.9           | 1  |
|            | W/E16 High Containment Radiation       |  |    |    |    |    |   |   |               |    |
|            | K/A Category Totals:                   | 1  | 2  | 1  | 2  | 2  | 2 | Tier Point Total:   |               | 10 |

Note: \* items rated < 2.5 in the KA catalog have been rated > 2.5 for PVNGS LSROs JTA.

System 033 Loss of Intermediate Range NI and System W/E16 High Containment Radiation are not CE Systems and were therefore eliminated.

| Question # |  | K1 | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s)  | IR          | # |
|------------|--|----|----|----|----|----|----|----|----|----|----|---|---|-------------|---|
| 11         | 005 Residual Heat Removal                |    |    |    |    |    | X  |    |    |    |    |   | K6.03 Knowledge of the effect of a loss or malfunction on the following will have on the RHRs: RHR heat exchanger   | 2.6         | 1 |
| 12         | 015 Nuclear Instrumentation              |    |    |    |    |    |    |    |    |    |    | X | 2.2.31 Knowledge of procedures and limitations involved in initial core loading.  | 2.9         | 1 |
| 13<br>14   | 033 Spent Fuel Pool Cooling              |    |    |    |    | X  |    |    |    |    |    | X | K5.04 Knowledge of the operational implication of the following concepts as they apply to the Spent Fuel Pool Cooling System: Keff<br>A4.03 Ability to manually operate and/or monitor in the control room: Support systems for fill and transfer of SFPCS water  | 2.3*<br>2.9 | 2 |
| 15<br>16   | 034 Fuel Handling Equipment              |    |    |    |    |    |    | X  |    | X  |    |   | A3.01 Ability to monitor automatic operation of the Fuel Handling System including: Travel limits<br>A1.01 Ability to predict and/or monitor changes in parameters (to prevent exceeding design limits) associated with operating the Fuel Handling System controls including: Load limits  | 3.1<br>3.2  | 2 |
| 17         | 103 Containment                          |    |    |    | X  |    |    |    |    |    |    |   | K4.06 Knowledge of containment system design feature(s) and/or interlock(s) which provide for the following: Containment isolation system   | 3.7         | 1 |
| 18         | 062 AC Electrical Distribution           |    |    |    |    |    |    |    | X  |    |    |   | A2.01 Ability to (a) predict the impacts of the following malfunctions or operations on the ac distribution system; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Types of loads that, if de-energized, would degrade or hinder plant operation | 3.9         | 1 |
| 19         | 063 DC Electrical Distribution           |    | X  |    |    |    |    |    |    |    |    |   | K2.01 Knowledge of bus power supplies to the following: Major DC loads  | 3.1         | 1 |
| 20         | 002 Reactor Coolant                      |    |    |    |    |    | X  |    |    |    |    |   | K6.14 Knowledge of the effect or a loss or malfunction on the following RCS components: Core components   | 2.8         | 1 |
| 21         | 004 Chemical and Volume Control          |    |    |    |    |    |    |    |    |    |    | X | A4.03 Ability to manually operate and/or monitor in the control room: Construction and use of 1/M plots (inverse multiplication, criticality prediction method)   | 3.2         | 1 |
| 22         | 008 Component Cooling Water              |    |    |    | X  |    |    |    |    |    |    |   | K4.06 Knowledge of CCWS design feature(s) and/or interlock(s) which provide for the following: Auxiliary building CCWS isolation  | 2.6*        | 1 |
| 23         | 013 Engineered Safety Features Actuation |    |    |    |    |    |    |    |    |    |    | X | 2.2.25 Knowledge of bases in technical specifications for limiting conditions for operations and safety limits  | 3.7         | 1 |
| 24         | 064 Emergency Diesel Generator           |    |    |    |    |    |    |    |    | X  |    |   | A3.07 Ability to monitor automatic operation of the ED/G system, including: Load sequencing   | 3.7         | 1 |

| ES-701     |                               | LSRO PWR Written Examination Outline Emergency and Abnormal Plant Evolutions - Tier 2 |    |    |    |    |    |    |    |    |    |   | Form ES-701-2  |     |    |
|------------|-------------------------------|---|----|----|----|----|----|----|----|----|----|---|--|-----|----|
| Question # |                               | K1  | K2 | K3 | K4 | K5 | K6 | A1 | A2 | A3 | A4 | G | K/A Topic(s)   | IR  | #  |
| 25         | 072 Area Radiation Monitoring | X   |    |    |    |    |    |    |    |    |    |   | K1.04 Knowledge of the physical connections and/or cause effect relationships between the ARM system and the following systems: Control room ventilation   | 3.5 | 1  |
| 26         | 076 Service Water             | X   |    |    |    |    |    |    |    |    |    |   | K1.01 Knowledge of the physical connections and/or cause- effect relationships between the SWS and the following systems: CCW system   | 3.3 | 1  |
|            | 078 Instrument Air            |   |    |    |    |    |    |    |    |    |    |   |  |     |    |
|            | 079 Station Air               |   |    |    |    |    |    |    |    |    |    |   |  |     |    |
| 27         | 086 Fire Protection           |   |    | X  |    |    |    |    |    |    |    |   | K3.01 Knowledge of the effect that a loss or malfunction of the Fire Protection System will have on the following: Shutdown capability with redundant equipment  | 3.2 | 1  |
|            |                               |   |    |    |    |    |    |    |    |    |    |   |  |     |    |
| 28         | 006 ECCS                      |   |    | X  |    |    |    |    |    |    |    |   | K3.02 Knowledge of the effect that a loss or malfunction of the ECCS will have on the following: Fuel  | 4.4 | 1  |
| 29         | 022 Containment Cooling       |   |    |    |    |    |    |    | X  |    |    |   | A2.05 Ability to (a) predict the impacts of the following malfunctions or operations on the CCS; and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: Major leak in CCS | 3.5 | 1  |
| 30         | 026 Containment Spray         |   | X  |    |    |    |    |    |    |    |    |   | K2.01 Knowledge of bus power supplies to the following: Containment spray pumps  | 3.6 | 1  |
|            |                               |   |    |    |    |    |    |    |    |    |    |   |  |     |    |
|            |                               |   |    |    |    |    |    |    |    |    |    |   |  |     |    |
|            | K/A Category Totals:          | 2   | 2  | 2  | 2  | 1  | 2  | 1  | 2  | 2  | 2  | 2 | Tier Point Total:  |     | 20 |

**System 026, Containment Spray has been added per NOTE 9 of ES 701-2:** The facility licensee's JTA for fuel handlers should be used as the basis for eliminating or adding testable topics.

**Systems 006 ECCS and 022 Containment Cooling** are more IPE/PRA risk related systems than 078 Instrument Air and 070 Station Air Systems and were therefore used to replace these two systems. These two systems are also part of the LSRO JTA. System 070 Station Air System is not part of the LSRO JTA.

Note: \* items rated < 2.5 in the KA catalog have been rated > 2.5 for PVNGS LSROs JTA.

Facility: PVNGS Units 1,2,3

Date of Examination: 12/13/04-12/16/04

| Category                                | K/A #    | Topic  | IR   | #  |
|---|----------|--|------|----|
| 1.<br>Conduct of<br>Operations          | 2.1.5    | Use procedures & directives related to shift staffing and activities | 3.4  | 1  |
|   | 2.1.8    | Ability to coordinate activities outside the control room            | 3.6  | 1  |
|   | 2.1      |  |      |    |
|   | Subtotal |  |      |    |
| 2.<br>Equipment<br>Control              | 2.2.18   | Managing maintenance activities while shutdown                       | 3.6  | 1  |
|   | 2.2.20   | Knowledge of the process for troubleshooting                         | 3.3  | 1  |
|   | 2.2      |  |      |    |
|   | 2.2      |  |      |    |
|   | Subtotal |  |      |    |
| 3.<br>Radiation<br>Control              | 2.3.2    | Knowledge of ALARA   | 2.9  | 1  |
|   | 2.3.11   | Ability to control radiation release                                 | 3.2  | 1  |
|   | 2.3      |  |      |    |
|   | Subtotal |  |      |    |
| 4.<br>Emergency<br>Procedures /<br>Plan | 2.4.44   | Knowledge of Emergency Plan PAR's                                    | 4.0  | 1  |
|   | 2.4.4    | Entry level conditions for AOP/EOP                                   | 4.3  | 1  |
|   | 2.4      |  |      |    |
|   | Subtotal |  |      |    |
| 5.<br>Generic<br>Fundamentals           | K1.07    | 5.191006 Heat Exchangers and Condensers                              | 2.6  | 1  |
|   | K1.05    | 6.192001 Good characteristics of a moderator                         | 2.1* | 1  |
|   | Subtotal |  |      |    |
| Tier 3 Point Total                      |          |  |      | 10 |

Note: \* items rated < 2.5 in the KA catalog rate > 2.5 for PVNGS LSROs JTA.

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Facility: PVNGS Units 1,2,3 Date of Examination: 12/13/04-12/17/04

| Title / Description of Tasks (JPMs)   |   | KA / IR         | Type Codes*      | Evaluation (S or U) | Comment Page |
|---|---|-----------------|------------------|---------------------|--------------|
| <b>Administrative</b>   |   |                 |                  |                     |              |
| 1   | Knowledge of the refueling process.<br><br>JPM: Given an MBA transfer form set to review find 2 errors and the resulting impact on Tech Spec LCO 3.7.17.                              | 2.2.27<br>3.5   | N, A, T          |                     |              |
| 2   | Knowledge of 10 CFR: 20 and related facility radiation control requirements.<br><br>JPM: Determine proper REP and task, contact RP, and enter the RCA. Upon entering your EPD alarms. | 2.3.1<br>3.0    | D                |                     |              |
| 3   | Knowledge of the Emergency Plan.<br><br>JPM: Given a plant condition and references, identify the E-Plan classification.  | 2.4.29<br>4.0   | N                |                     |              |
| <b>Systems</b>  |   |                 |                  |                     |              |
| 1.  | Fuel Handling Equipment – Lift/Lower a component using the New Fuel Elevator.   | 034K402<br>3.3  | P, A, I          |                     |              |
| 2.  | Fuel Handling Equipment – Perform Refueling Machine Load Test and address TRM LCO 3.9.102   | 034A101<br>3.2  | N, A, I, T       |                     |              |
| 3.  | Area Radiation Monitors –Verify SFHM bridge ARM alarm function is operable.   | 072A201<br>2.9  | N, A, I          |                     |              |
| 4.  | AC Electrical Distribution – Complete the Electrical Checklist for the SFHM   | 062A404<br>2.7  | N, I             |                     |              |
| <b>Emergency / Abnormal Plant Evolutions</b>  |   |                 |                  |                     |              |
| 1.  | Loss of SDC – Loss of Inventory in the Refuel Pool  | 025AA102<br>3.9 | N, A, I,<br>R, T |                     |              |
| 2.  | Respond to Irradiated Fuel Damage in the Fuel Bldg  | 036AA202<br>4.1 | N, A, I, R       |                     |              |
| 3.  | Loss of a Startup Channel during Refueling  | 032AA202<br>3.9 | P, T             |                     |              |
| Type Codes & Criteria:<br>(A)lternate path ( 2 systems; 1 E/APE)<br>(C)ontrol room<br>(D)irect from bank ( ≤ 7)<br>(I)n-plant<br>(N)ew or (M)odified from bank including 1(A) ( ≥ 1 / section)<br>(P)revious two exams ( ≤ 1 / section)<br>(R)efueling accident (1)<br>(T)echnical specification ( ≥ 2) |   |                 |                  |                     |              |

| Tier / Group | Randomly Selected K/A | Reason for Rejection   |
|--------------|-----------------------|--|
| 1            | 058AK3.01             | Not relevant to the LSRO job position  |
| 1            | 058AK3.02             | This procedure is used by the CRS not the LSRO   |
| 1            | 062AK3.03             | Guidance given in the EOP is not a LSRO function   |
| 1            | 032AK3.03             | Not a LSRO function  |
| 1            | 056AK1.01             | Not a LSRO function  |
| 1            | 056AK1.03             | Not a LSRO function  |
| 1            | 056AK1.04             | Not a LSRO function  |
| 1            | 026AA1.01             | Not a LSRO function  |
| 1            | 026AA1.02             | Not a LSRO function  |
| 2            | 072A2.01              | Selected for Operating Test  |
| 2            | 072A2.02              | Not a LSRO function  |
| 2            | 072A2.03              | Not a LSRO function  |
| 2            | 033A4.01              | The RO / CRS monitor this in the Control Room. Not an LSRO function.   |
| 2            | 033A4.02              | The RO / CRS monitor this in the Control Room. Not an LSRO function.   |
| 2            | 033A4.03              | The RO / CRS monitor this in the Control Room. Not an LSRO function.   |
| 2            | 022A4.01-4.05         | The RO / CRS monitor this in the Control Room. Not an LSRO function.   |
| 2            | 076A4.01-4.05         | The RO / CRS monitor this in the Control Room. Not an LSRO function.   |
| 1            | 032AK3.02             | There is no guidance in either the EOPs or AOPs @ PVNGS for loss of SR NIs. Resampled KA within same system. |
| 2            | 002A1.11              | This is not an LSRO Job Task. KA rejected and resampled within same system.                                  |
| 2            | 034A1.02              | Rejected due to oversampling loss of inventory and resampled within same KA category.                        |