NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-A1

Title: Apply Overtime Limit Restrictions

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform _____X_____ Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References: OM14.ID1, Fatigue Management Rule Program, rev 30

Alternate Path: Yes _____ No _____X_____

Time Critical: Yes _____ No _____X_____

Time Allotment: 15 minutes

Critical Steps: Per answer key

Job Designation: RO

Rev Comments: Revised from L061 (NRCADM061-COO-RO2)

Gen KA # / Rating: 2.1.5 – Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc. 2.9

AUTHOR: **LISA TORIBIO** DATE: **12/03/19**

OPERATIONS REPRESENTATIVE: **CHRIS MEHIGAN** DATE: **12/03/19**

Directions: The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the step at which to begin.

Required Materials: OM14.ID1, Fatigue Management Rule Program rev 30

Initial Conditions: GIVEN:

- It is 0600 on Monday morning, 2/17
- Both Units are operating at 100% power
- You have just been contacted by the SM and requested to come in as the relief BOP
- Below is a summary of your hours for the previous week:

Day	Start Time	End Time	Position
14 Day vacation			
Saturday, 2/8	0700	1900	Control Operator
Sunday, 2/9	1200	2200	WC Extra
Monday, 2/10	Day off		
Tuesday, 2/11	0700	1900	Control Operator
Wednesday, 2/12	0700	1900	WC Extra
Thursday, 2/13	1900	0700	Balance of Plant Operator
Friday, 2/14	1900	0700	Balance of Plant Operator
Saturday, 2/15	1900	0700	Control Operator
Sunday 2/16	Day off		
Monday 2/17 (proposed)	0700	1900	Balance of Plant Operator

- The WorkForce scheduling program is out of service

Initiating Cue: Review your hours and determine if you can accept the watch, including details to support your evaluation.

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

	NOTE: Do NOT provide examinee with Task Standard
Task Standard	The candidate determines: • **Cannot accept the watch** • **(Per procedure step 5.1.7) Less than a 34 hour break in any 9 day period. (no more than 33 hours)**

Start Time: _____ **Stop Time**:_____

Follow up Question Documentation:

Question: _____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

_____

_____

Examinee Response - Key

• **The candidate determined they are not available to take the watch. - Critical**
• **Basis: Covered Workers allowable work hours during Non-Outage Conditions**
  ○ Can not exceed 16 hours in any continuous 24 period: **Satisfactory (max was 12 hours) - not critical**
  ○ Can not exceed 26 hours in any continuous 48 period: **Satisfactory (max was 24 hours) - not critical**
  ○ Can not exceed 72 hours in any continuous 168 period: **Satisfactory (max was 72 hours) - not critical**
  ○ **34 hour continuous break required in any 9 day period: Unsatisfactory (taking the relief watch at 0700 on Monday would result in a continuous break of 33 hours in the past 9 day period) - Critical**
  ○ **10 hour continuous break minimum break required between shifts: Satisfactory (minimum was 12 hours) - not critical**

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NOTE:

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- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

Evaluation Results and Basis	
___ **Available** ___ **Unavailable**	**Basis:**

Fatigue Management Rule Program

05/09/19
Effective Date

QUALITY RELATED

Table of Contents

1. SCOPE

1.1 This procedure applies to all PG&E employees, contractors, vendors, TAs, and on-loan personnel who:

1.1.1 Hold unescorted access or unescorted access authorization to the station's protected areas.

1.1.2 Perform radiation protection or chemistry duties required as a member of the onsite emergency response organization minimum shift complement.

1.2 This procedure implements requirements for fatigue management and related work hour controls per 10 CFR 26, Subpart I, "Managing Fatigue."

1.3 This procedure establishes the following:

1.3.1 Requirements prescribed by 10 CFR 26, Subpart I.

1.3.2 Process for implementing work hour limits for workers performing work subject to 10 CFR 26, subsection 26.205, "Work Hours."

1.3.3 Process used to schedule, track, and calculate work hours.

1.3.4 Conditions and process applicable to covered work hour limit waivers.

1.3.5 Conditions and process applicable to non-covered work hour limit authorizations.

1.3.6 Conditions and process applicable to performing "Fatigue Assessments."

2. DISCUSSION

2.1 DCPP began using the maximum average work hours (AVG 54) method effective Monday, July 29, 2013.

2.2 The requirements of this procedure are intended to provide reasonable assurance that worker fatigue is avoided and all workers will be able to safely perform their duties and maintain the health and safety of the public.

3. DEFINITIONS

3.1 Behavior Observation Program (BOP) Supervisor: Individual trained/qualified as a fitness for duty supervisor (FFDSUP) responsible for ensuring individuals have the correct fatigue management rule (FMR) classification in the site computer system and are responsible to implement BOP for assigned personnel.

3.2 Break: The number of hours between the time an individual leaves work and starts their next work period; excludes turnover on one end of the work period.

3.3 Circadian Factors: Human physiological processes, such as body temperature and hormone releases, that may affect alertness and cognitive or motor functioning.

3.4 Covered Work: Work that includes:

3.4.1 Operating or on-site directing of the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety.

3.4.2 Performing on-site maintenance or on-site directing of the maintenance on Systems, Structures, and Components (SSCs) that a risk-informed evaluation process has shown to be significant to public health and safety.

3.4.3 Performing radiation protection or chemistry duties required as a member of the on-site emergency response organization minimum shift complement.

3.4.4 Performing operations responder duties that includes oversight of the effect of fires and fire suppression on safe shutdown systems.

3.4.5 Performing security duties including but not limited to an armed responder, Zebra, Nora, Alarm Station Officer, Watch Commander, Response Team Leader, or Nuclear Security Sergeant.

3.5 Covered Worker: An individual who is:

3.5.1 Subject to work hour controls under the FMR.

3.5.2 Granted unescorted access to the station's protected area and performs covered work.

3.6 Day Off: A day when a work period does not begin.

3.7 Directing: The exercise of control over a work activity by a worker who is directly involved in the execution of the work activity, and either:

3.7.1 Makes technical decisions for that activity without subsequent technical review.

3.7.2 Is ultimately responsible for the correct performance of that work activity.

3.8 Electronic Tracking System: A software application used to schedule, develop, and track work hours and evaluation periods.

3.9 Evaluation Period: A rolling six week period that includes the current week and the five previous weeks.

3.10 Fatigue: The degradation of an individual's cognitive and motor functions as a result of inadequate rest.

3.11 Fatigue Assessment: An assessment performed by the Shift Manager, security watch commander, or a qualified BOP supervisor for the following reasons:

3.11.1 For Cause

3.11.2 Post Event if required per OM14.ID5, "Fitness For Duty Program For-Cause and Post Event Chemical Testing"

3.11.3 Self-Declaration

3.11.4 Follow-Up

3.12 Fatigue Management Rule (FMR) Representative: Individual selected by director, manager, or supervisor to become knowledgeable in FMR program to assist with FMR implementation in the department, section or work group. FMR representatives from operations, maintenance, site services contractor, radiation protection, chemistry, and security assist with FMR implementation.

3.13 Incidental Duties: Unscheduled work activities performed off-site, including telephone calls and work required by the supervisor to complete off-site, that are required by the station but do not exceed a nominal 30 minutes in a single break period.

3.14 Nominal: Quantity of time spent on work activities to not exceed 30 minutes plus 25% (37.5 minutes total) in a single break period.

3.15 Non-Incidental Duties: Work activities performed off-site that are required by the station and exceed a nominal 30 minutes in a single break period.

3.16 Operations Responder: A designated operations person on shift who provides fire brigade oversight for the effect of fires and fire suppression on safe shutdown equipment.

3.17 Outage: The time when the output breakers are open and the unit is not connected to the grid.

3.18 Overtime Limits: Controls that limit the number of overtime hours and/or consecutive days personnel may work.

3.19 Restorative Sleep: A brief opportunity with accommodations for restorative, uninterrupted sleep of at least one half hour in a designated area.

3.20 Risk Informed SSCs: Those systems that fall under the Maintenance Rule and designated as "risk significant" (refer to Attachment 1). At DCPP, work on all Maintenance Rule SSCs is treated as covered work to prevent minor errors and to take a conservative approach.

3.21 Site Senior-Level Manager: An individual in the position of vice president nuclear generation, Station Director, senior director, or director.

3.22 Turnover Time: Time at the beginning or end of a work period that allows personnel to become familiar with their job duties and responsibilities or to transfer pertinent information to personnel assuming their job duties or responsibilities.[T35087]

3.23 Waiver Assessment: An assessment authorized by the security watch commander or Shift Manager, with concurrence from a site senior-level manager, because the need exists to waiver FMR requirements to protect the health and safety of the public or plant security. This assessment is performed by a qualified BOP supervisor knowledgeable of the work to be performed.

3.24 Work Day: A work day is those consecutive hours from the start of a shift. All hours continuously worked after midnight on a shift that started before midnight count for the previous day.

3.25 Work Hours: The amount of time an individual performs duties for the station. This includes all work hours, with the following exceptions:

3.25.1 Shift turnover time.

3.25.2 Within-shift breaks and rest periods in which there is reasonable opportunity and accommodations for restorative sleep, such as a nap, greater than 30 minutes.

3.25.3 Unscheduled work hours for the purpose of participating in unannounced emergency preparedness exercises and drills are excluded.

3.25.4 Periods defined in writing by the NRC.

3.26 Work Period: All work hours where restorative sleep does not occur.

3.27 Work Week: A work week is defined as follows:

3.27.1 Operations use a seven day work week that starts at 0001hrs on Monday morning and continues through 2400hrs on Sunday night.

3.27.2 All other departments use a seven day work week that starts at 0001hrs on Sunday morning and continues through 2400hrs on Saturday night.

4. RESPONSIBILITIES

4.1 Site senior-level managers are responsible for:

4.1.1 Authorizing work as meeting the requirements to protect the health and safety of the public.

4.1.2 Ensuring at least once per calendar year a review is performed to monitor hours worked for compliance with the FMR.

4.1.3 Concurring with waivers authorized by the Shift Manager and security watch commander.

4.2 Shift Managers and watch commanders (for security issues), are responsible for:

4.2.1 Determining work is required to protect the health and safety of the public and, with concurrence from site senior-level management, authorizing FMR waivers.

4.2.2 Providing clarifications on applicability of overtime limits.

4.2.3 Ensuring individual work hours are managed with the objective to prevent impairment from fatigue due to the duration, frequency, sequencing of successive shifts or call-in, or incidental duties.

4.2.4 Performing reviews as requested by the vice president nuclear generation or Station Director.

4.3 Supervisors, or managers when evaluating supervisors, are responsible for:[T34188]

4.3.1 Ensuring no personnel exceed 10 CFR 26 Subpart I work hour limits without appropriate prior authorization and waiver.

4.3.2 Ensuring personnel transitioning from non-covered work to covered work include all hours worked in their work hour calculations.

4.3.3 Assessing personnel fitness to perform assigned work within four (4) hours of covered work performance.

4.3.4 Ensuring assigned personnel have the correct FMR classification code indicated in the site computer system.

4.4 Section managers are responsible for conducting:

4.4.1 A quarterly review of section personnel work hour reports for violations and waivers to evaluate FMR compliance.

4.4.2 The section FMR representative may assist the manager with the review.

4.5 Department directors are responsible for conducting:

4.5.1 Annual review of department personnel work hour reports for violations and waivers to evaluate FMR compliance.

4.5.2 The department FMR representative may assist the director with the review.

4.6 Station personnel are responsible for:[T34188]

4.6.1 Being capable of performing assigned work.

4.6.2 Reporting fatigue.

4.6.3 Being aware of hours worked in previous 14 days.

4.6.4 Knowing applicable overtime limits.

4.6.5 Obtaining approval to work overtime.

4.6.6 Timely entry of work schedule changes in tracking software so potential violations are identified and addressed before a violation occurs.

4.7 Quality verification director is responsible for:

4.7.1 Ensuring FFD audits are performed at the appropriate frequency, scope, and depth.

4.7.2 Reviewing and approving FFD audit reports and related audit documents.

4.8 Quality verification personnel are responsible for:

4.8.1 Coordinating and conducting FFD audits at the appropriate frequency, scope, and depth

4.8.2 Preparing and submitting FFD audit reports and related audit documentation

4.9 Payroll supervisor is responsible for retaining records of hours worked and FMR waivers for three (3) years.

4.10 Access/FFD manager is responsible for:

4.10.1 Gathering and reporting data to NRC per 10 CFR 26.203(e).

4.10.2 Coordinating annual effectiveness review of work hour control per 10 CFR 26.205(e).

5. INSTRUCTIONS

5.1 Covered Work

5.1.1 General Provisions

a. Managers and directors should complete periodic reviews of program violations and waivers to evaluate program health.

1. Managers should review FMR reports on a quarterly basis and directors on an annual basis.

a) FMR representatives may assist the manager or director with the review. SAPN will be used to track the reviews for covered work.

2. The access/FFD manager should assign tasks from a SAPN to track reviews completed by managers and/or directors.

b. Audits

NOTE:	FMR Program audits are conducted during the FFD Program audit performed by quality.

1. Quality shall audit the management of worker fatigue by reviewing all electronic and hard copy information retained to track work performed under the fatigue management program. Such information may include:

a) FMR waiver forms

b) Electronic time reporting records

c) Payroll summary reports

2. Audits shall focus on the effectiveness of the fatigue management program.

3. The individuals performing the audit of the program shall be independent from both the subject FFD program's management and from personnel who are directly responsible for implementing the FFD program.

4. The result of the audits, along with any recommendations, shall be documented and reported to site senior-level management.

5. Each audit report shall identify:

    a) Conditions that are adverse to the proper performance of the FFD program

    b) Cause of the condition(s)

    c) Recommended corrective actions, when appropriate

6. Review of audit findings shall require corrective actions, including re-auditing of the deficient areas where indicated, to preclude, within reason, repetition of the condition.

7. The resolution of the audit findings and corrective actions shall be documented in the corrective action program.

8. Audits shall be performed on 24 month cycle.

c. Reports

1. Payroll shall provide a summary for of all instances during the previous calendar year in which work hour controls were waived.

    a) The summary shall include only those waivers under which work was performed.

2. If it was necessary to waive more than one work hour control during any single extended work period, the summary of instances shall include each of the work hour controls that were waived during the period.

    a) When creating the report, each work hour control waived on a single waiver counts as a separate waiver.

3. For each category of workers specified, the station shall:

    a) Report the number of instances in which each work hour control specified was waived for workers not working on outage activities.

    b) Report the number of instances in which each work hour control was waived for workers working on outage activities.

    c) Provide a summary that shows the distribution of waiver use among the workers within each category of workers identified (e.g., a table that shows the number of workers that received only one waiver during the reporting period, the number of workers that received a total of two waivers during the reporting period, etc.).

    d) Provide a summary of corrective actions, if any, resulting from the analyses of data, including fatigue assessments.

4. Reports for only waivers actually used shall be provided to the NRC when requested. The reports shall include:

    a) The name of the worker performing the work.

    b) The name of the worker's supervisor.

    c) A description of the work performed.

    d) The outcome of the work performed.

    e) The need for the waiver.

    f) The name of the person authorizing the waiver.

    g) The name of the supervisor approving the waiver.

5. Reports covering all instances where FMR violations occurred and waivers were not issued shall be provided to site senior-level management. The reports shall include the information requested in step 5.1.1c.4.

6. Reports related to fatigue management can be integrated into the overall FFD report and may be submitted electronically using EIE system and the NRC provided format.

7. Reports shall be generated every 12 months.

    a) The initial reports generated under this procedure shall cover the period October 1, 2009, through December 31, 2009.

    b) Subsequent reports shall cover the period January 1 through December 31.

    c) Reports for data collected shall be submitted to the NRC before March 1 of the following year.

5.1.2 Affected Personnel

NOTE:	For the purposes of compliance with the FMR, directing only applies to operations and maintenance activities.

a. Any workers on-site with unescorted access who perform work within any of the following job categories are considered covered workers subject to work hour controls.

1. Operations

a) Workers operating or on-site directing of work activities for SSCs that a risk-informed evaluation process has shown to be significant to public health and safety.

b) Workers performing the duties of operations responders who are specifically designated due to their understanding of the effects of fire and fire suppressants on safe shutdown capability.

2. Maintenance

a) Workers performing on-site maintenance or on-site directing of work activities for SSCs that a risk-informed evaluation process has shown to be significant to public health and safety.

3. Radiation Protection and Chemistry

a) Workers performing duties which are part of the on-site Emergency Response Organization (ERO) minimum shift complement.

b) Support staff is not covered by the FMR.

4. Security

a) Workers performing duties including but not limited to an armed responder, Zebra, Nora, Alarm Station Officer, Watch Commander, Response Team Leader, or Nuclear Security Sergeant.

5. Other Personnel

a) Any other workers normally considered non-covered workers performing operations or maintenance activities addressed in steps 5.1.2a.1, 5.1.2a.2, 5.1.2a.3, and 5.1.2a.4.

1) The FMR may apply to other personnel who, without further oversight, provide direction to operations and maintenance covered workers.

2) If non-covered workers perform covered work, the covered work restrictions since the beginning of the cycle (evaluation period) apply until the covered work is complete.

3) If the normally non-covered worker performs covered work intermittently throughout the cycle, he or she should be left as "covered" throughout the cycle.

(a) The fatigue rule covered indicator is tracked in the site computer system on the personnel screen using the Nuclear Fatigue Rule (NFR) Covered Worker field.

(1) Supervisors and managers may review the personnel screen in the site computer system to determine covered status for their staff.

(2) Whenever an individual is processed for unescorted access the NFR Covered Worker field defaults to covered status.

(3) When an individual in a non-covered status changes organizations, the status will be evaluated by the fatigue owner to determine if they need to return to covered status.

5.1.3 All site personnel should make timely entry of work schedule changes in tracking software so potential violations are identified and addressed before a violation occurs.

5.1.4 Fatigue Assessments

a. Requirements for Fatigue and Waiver Assessments

1. Assessments shall be conducted face to face with the worker whose alertness may be impaired.

2. At a minimum, the assessments shall address the worker's work history for the past 14 days while considering the following factors:

a) Acute fatigue

b) Cumulative fatigue

c) Circadian factors

3. The assessor shall not conclude that fatigue has not or will not degrade the worker's ability to safely and competently perform his or her duties solely on the basis that the worker's work hours have not exceeded any of the limits specified or that the worker has had the minimum breaks required or minimum days off required, as applicable.

4. The results of any assessment conducted shall be documented including a description of the circumstances that necessitated the fatigue assessment and any controls and conditions that were implemented.

a) If a worker disagrees with the results of an assessment, the worker may request a second assessment by a trained assessor.

5. The Fatigue Management Rule Program owner shall prepare an annual summary of instances of assessments that were conducted during the previous calendar year for any worker for which a fatigue assessment was performed.

a) The summary shall include:

1) The conditions under which each assessment was conducted (i.e., self-declaration, for cause, post-event, or follow up).

2) A statement of whether or not the worker was working on outage activities at the time of the self-declaration or condition resulting in the assessment.

3) The category of duties the worker was performing at the time of the self-declaration or condition resulting in the assessment.

4) Management actions, if any, resulting from each assessment.

6. If a worker was determined to be fit for duty and he or she disagrees with the finding, the work supervisor shall consider the impact of the worker working under distress.

    a) The work supervisor should contact his or her management to discuss options and trending.

7. Workers shall provide complete and accurate information that may be required to address the factors listed in step 5.1.4b.6.

    a) Inquiries shall be limited to only the personal information necessary to assess the factors.

b. Fatigue Assessments

1. Fatigue assessments shall be documented on the Fatigue Assessment Form, Form 69-21350.

    a) The completed form shall be

        1) Documented in a SAPN notification

        2) Forwarded to the access/FFD manager.

2. Fatigue assessments shall be conducted under the following conditions:

    a) For cause

        1) In addition to any other test or determination of fitness that may be required, a fatigue assessment shall be conducted in response to an observed condition of impaired individual alertness creating a reasonable suspicion that a worker is not fit to safely and competently perform his or her duties, except if the condition is observed during a worker's break period.

        2) If the observed condition is impaired alertness with no other behaviors or physical conditions creating a reasonable suspicion of possible substance abuse, DCPP need only conduct a fatigue assessment.

            (a) If there is reason to believe that the observed condition is not due to fatigue, a fatigue assessment is not required.

            (b) The access/FFD manager shall be consulted to determine if a for-cause FFD test will be conducted per OM14.ID5.

b) Self-declaration

1) A fatigue assessment shall be conducted in response to a worker's self-declaration to his or her supervisor that he or she is not fit to safely and competently perform his or her duties for any part of a working tour because of fatigue, except if, following the self-declaration, the station permits or requires the worker to take a rest break of at least 10 hours before the worker returns to duty.

c) Post-event

1) A fatigue assessment shall be conducted in response to events requiring post-event drug and alcohol testing as specified in OM14.ID5.

(a) Necessary medical treatment shall not be delayed in order to conduct a fatigue assessment.

d) Follow up

1) If a fatigue assessment was conducted for cause or in response to a self-declaration, and the worker returns to duty following a break of less than 10 hours in duration, the worker shall be reassessed for fatigue as well as the need to implement controls and conditions before permitting the worker to resume performing any duties.

3. In the case of a fatigue assessment conducted for cause, the individual who observed the condition of impaired alertness may not conduct the fatigue assessment.

4. The supervisor performing the fatigue assessment should be a qualified BOP supervisor and qualified to direct the work performed by the worker.

a) If the BOP supervisor is not available, another qualified BOP supervisor may be used (i.e., security or operations supervisor).

5. In the case of a post-event fatigue assessment, the individual who conducts the fatigue assessment may not have:

a) Performed or directed (on site) the work activities during which the event occurred.

b) Performed, within 24 hours before the event occurred, a fatigue assessment of the workers who were performing or directing (on site) the work activities during which the event occurred.

c) Evaluated or approved a waiver of the limits specified for any of the workers who were performing or directing (on site) the work activities during which the event occurred, if the event occurred while such workers were performing work under that waiver.

6. A fatigue assessment shall provide the information necessary for management decisions and actions in response to the circumstance that initiated the assessment.

7. Upon notification of a self-declaration of fatigue or stress by security personnel, the security watch commander shall:

a) Perform a fatigue assessment to ensure the symptoms, contributing factors, and effects of fatigue or stress do not adversely affect the employee's performance, except if following the self-declaration, the station permits or requires the worker to take a rest break of at least 10 hours before the worker returns to duty.

b) Document the basis of the recommendation and forward it to the security manager for review and approval and generate a notification documenting the review and approval.

c. Waiver Assessments

1. If there is no supervisor on site who is qualified to direct the work, the assessment may be performed by a supervisor who is qualified to provide oversight of the work to be performed. This may be a second level supervisor or manager.

2. Following a fatigue assessment, the assessor shall determine and implement the controls and conditions, if any, necessary to permit the worker to resume performing duties, including the need for a break.

5.1.5 Directing Work

a. For the purposes of compliance with the FMR, "directing" applies only to the following operations and maintenance activities:
   - On-site directing of the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety.
   - On-site directing of maintenance on SSCs that a risk-informed evaluation process has shown to be significant to public health and safety.

b. Directing may apply to personnel who, without further oversight, provide direction, to covered workers from operations and maintenance.

   1. If non-covered workers direct covered work, the covered work restrictions since the beginning of the cycle (evaluation period) apply until the covered work is complete.

      a) If the normally non-covered worker directs covered work intermittently throughout the cycle, he or she should be left as "covered" throughout the cycle.

c. Consideration should include all of the following when determining if an individual is directing an operations or maintenance activity:

   1. Is the individual on site?

   2. Is the individual the first line supervisor or foreman?

   3. Is the individual directly involved in the execution of the work activity?

   4. Is the individual making technical decisions for that activity without subsequent technical reviews?

   5. Is the individual ultimately responsible for the correct performance of that work activity?

d. The following tasks are examples of activities generally considered NOT directing:

   1. Engineering tasks

   2. Supervising maintenance on a non-covered SSC

   3. Supervising at second level supervision

   4. Conducting work control center documentation activities

   5. Writing a work procedure

   6. Preparing a work or modification package

7. Training personnel during which time the trainee is not operating or performing maintenance activities

8. Reviewing and approving documents

9. Performing any work that is not operations or maintenance on risk significant SSCs (refer to Attachment 1)

10. Technical staff providing recommendations to control room staff

11. Senior management reviewing work plans

12. Contractors, vendors, or engineers providing recommendations on test performance, component and system operation, or other similar technical inputs

e. Position alone should not be the deciding factor when determining personnel covered by the FMR. For example, a Shift Manager is a second level supervisor, but, in practice and as provided in 10 CFR 26, has the authority to direct covered activities.

1. Analyze and evaluate all criteria prior to determining applicability or exclusions.

5.1.6 Minimum Days Off (MDO)

a. The requirements outlined in this section only apply during the first 60 days of an outage.

Table 1: Required Minimum Days Off for Various Shift Schedules (Outage)

Group	8-Hour Shift	10-Hour Shift	12-Hour Shift
Maintenance	1 day off/in any 7-day period	1 day off/in any 7-day period	1 day off/in any 7-day period
Operations, Radiation Protection, Chemistry, Ops responder	3 days off/successive (i.e., non-rolling) 15-day period	3 days off/successive (i.e., non-rolling) 15-day period	3 days off/successive (i.e., non-rolling) 15-day period
Security	4 days off/successive (i.e., non-rolling) 15-day period	4 days off/successive (i.e., non-rolling) 15-day period	4 days off/successive (i.e., non-rolling) 15-day period

1. The option of keeping workers on normal operations work hour restrictions is still available during outages.

2. The table above applies to the first 60 days of a unit outage; after this 60-day period expires, normal online work hour limits shall apply.

   a) The 60-day period may be extended seven days for a worker for each 7-day block during which they work 48 hours or less.

   b) Multiple 7-day extensions may be given to a worker as long as the 7-day blocks are not overlapping.

3. Minimum days off may be scheduled any day of the week.

   a) Maintenance shall meet at least one day off in a 7-day rolling period.

   b) For all other covered workers, there is no restraint as to when required days off occur during the 15-day fixed period.

b. For purposes of work hour calculations, average hours worked, and minimum days off calculations, work hours in response to the following situations are excluded from meeting 10 CFR 26, Subpart I requirements:

1. Plant emergencies as defined in the Emergency Plan.

   a) After a declared emergency drill is terminated, employees require a 10 hour break before the start of the next shift to reset their FMR hours.

   b) Employees require a 34 hour break before the start of the next shift if they have not had a 34 hour break in the previous 9 days.

2. Unannounced emergency preparedness exercises and drills (unscheduled work hours ONLY).

    a) After an unannounced drill is terminated, employees require a 10 hour break before the start of the next shift to reset their FMR hours.

    b) Employees require a 34 hour break before the start of the next shift if they have not had a 34 hour break in the previous 9 days.

3. Security response.

    a) Force-on-force tactical exercises: Exclude hours worked by security personnel during the actual conduct of NRC evaluated force-on-force tactical exercises when calculating the worker's average work hours.

    b) Common defense and security: When informed in writing by the NRC that the requirements of the FMR are waived for security personnel to ensure the common defense and security, workers exclude FMR requirements for the duration of the period defined by the NRC.

c. If one or both units are in an outage, those licensed operators composing the minimum shift complement of operators required under 10 CFR 50.54(m) for the operating unit, including the operator at the controls specified in 10 CFR 50.54(k) and the senior operator in the control room required under 10 CFR 50.54(m)(2)(iii), are not eligible for the MDO requirements permitted by 10 CFR 26.205(d)(4).

    1. 10 CFR 26 Subpart I does not prohibit these individuals from performing outage activities.

        a) An operator who has been working outage work hours and has had 2 days off in the previous 7-day period may provide relief to the operator at the controls or the senior operator in the control room, if an appropriately qualified operator who has been working nonoutage work hours is not immediately available to provide relief.

b) If an operator who has been working outage work hours and has had 2 days off in the previous 7-day period is not immediately available, an operator who has been working outage hours may provide either:

1) Short-term relief (up to 2 hours) for the operator at the controls or the senior operator in the control room without a waiver.

2) Longer term relief (more than 2 hours) under a waiver of the MDO requirement that is applicable to the shift schedule (i.e., 8-, 10-, or 12-hour shifts) for personnel assigned to the operating unit.

2. When one unit is in an outage and there is one unit operating, the FMR requires 2 reactor operator (RO) licenses and 2 senior reactor operator (SRO) licenses assigned to the shift to be working under nonoutage work restrictions.

a) At least one RO shall be at the controls of the reactor and one SRO shall be in the control room.

d. Workers performing or directing work who are normally non-covered assume the covered work requirements for their assigned department to perform or direct covered work for the length of their assignment and for the work history in the cycle, prior to performing or directing the covered work.

e. Workers temporarily performing or directing covered work who do not leave their normal work department and are normally non-covered, shall follow maintenance work requirements. For example, an engineer giving direction to maintenance workers for a specific job without further oversight is required to meet maintenance covered work requirements for the length of the job and for his or her work history in the cycle.

5.1.7 Work Hour Limits

a. The following limits apply to covered workers regardless of unit status:

1. No more than 16 work hours in any 24-hour period.

2. No more than 26 work hours in any 48-hour period.

3. No more than 72 work hours in any 7-day period.

4. At least a 10-hour break between successive work periods, or an 8-hour break when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts.

5. A 34-hour break in any 9 day period.

b. Workers performing covered work while the station is on-line are limited to 54 work hours per week when averaged over the rolling 6-week cycle.

c. The following limits apply for workers performing covered work during outages:

1. Minimum days off:

a) 1 day off per week for maintenance personnel.

b) 3 days off for operations, radiation protection, chemistry, and operations (fire) responder personnel every 15 days.

c) 4 days off for security personnel every 15 days.

5.1.8 Breaks

a. Workers shall have, at minimum, the rest breaks specified in step 5.1.7.

b. For the purposes of this section, a break shall be an interval of time that falls between successive work periods, during which the worker does not perform any duties other than one period of shift turnover either at the beginning or at the end of a shift, but not both, for purposes of break calculation. Refer to step 5.1.12a for turnover exceptions related to minimum break between shifts and a 34 hour continuous break in 9 days.

5.1.9 Sanctions and Disciplinary Actions

a. Workers shall report to work fit for duty and on schedule.

b. Workers exhibiting chronic self-declaration that they are not fit for duty as a result of fatigue should be considered for referral to the employee assistance program.

c. Workers exhibiting chronic self-declaration that they are not fit for duty as a result of fatigue, absent a sound medical reason, may be subject to disciplinary action.

1. Personnel are required to be fit for duty and get sufficient rest to ensure they are not subject to fatigue.

a) Persons who make choices that result in less than the sleep necessary for that person to remain alert and avoid fatigue are not meeting their obligation per this rule.

d. The refusal on the part of a worker to submit to a fatigue assessment shall subject the worker to disciplinary action and possible removal from unescorted access.

1. Facts to be considered in assessing disciplinary action shall include the employee's job assignment and past work record.

e. Personnel subject to the fatigue assessments who refuse to be assessed shall be considered fatigued and unable to perform their duties.

1. Time away from work for fatigue management recovery shall be classified as personal time off, if available, or non-paid time.

5.1.10 Schedule Transitions

a. An 8 hour break shall only be allowed before the first shift of the new schedule.

b. A worker shall have a continuous 34 hour break in any rolling 9 day period.

c. The MDO requirements shall be met for outage schedules.

d. Outage schedules.

e. Schedule transitions, when output breakers change state, may present problems and should be addressed on a case by case basis for covered workers entering an outage.

1. Follow outage rules if the plant experiences an unplanned trip.

a) If the schedule before the trip would have provided for work hours and breaks within the FMR, no violation of the FMR occurs.

2. When the outage is planned, ensure the schedule meets all work hour and minimum break requirements prior to breaker opening in order to assume outage requirements.

3. A short cycle (less than 6 weeks) occurs in order to have plant personnel resume their normal 6 week cycle. Refer to step 5.1.10h.3.

4. Consider AVG 54 requirements and hours worked.

f. Workers may work 72 hours in a 7 day period the week before or after outages as long as the following conditions are met for the non-outage schedule:

1. The average hours worked

2. MDO requirements during the outage.

g. Transition from covered work to non-covered work presents no problem for the FMR.

1. While performing non-covered work, FMR restrictions do not apply for the worker; however, exceeding overtime limits prescribed the FMR requires notification to the worker's management.

h. If transitioning into or out of an outage, normal operations work hour rules apply.

1. Outage hours start the shift following breaker opening.

2. Non-outage hours start the shift following breaker closing.

3. A new evaluation period may be used at the completion of an outage.

4. Post-outage transitions are in compliance if the schedule for the evaluation period would have provided for the required average days off and the average non-hours worked.

5. If the interval between outages for a worker is less than nine (9) days, then the worker shall have a 34-hour break period and shall not exceed the following limits:

a) 16 work hours in any 24-hour period

b) 26 work hours in any 48-hour period

c) 72 work hours in any 7-day period

6. A minimum of 2 days off in the preceding 7-day period may be acceptable for operators who have been working outage hours on 10- or 12-hour shifts before they transition to the non-outage unit as one of the two required operators working non-outage minimum days off.

a) This applies only during outages when transitioning a specific SRO or RO from the outage unit to the non-outage unit.

b) This does NOT apply when a nuclear operating unit transitions from an outage to on-line operations.

7. When entering an unplanned outage, the station shall be considered in compliance with the FMR if the schedule for the evaluation period would have provided for the required days off.

8. For the purposes of compliance with the minimum days off requirement, shifts worked by security personnel during the actual conduct of NRC-evaluated force-on-force tactical exercises when calculating the worker number of days off may be excluded.

9. When entering an outage or any evaluation period less than one week in duration, the evaluation period MDO is calculated using the ratio of the number of days off per week required for a 7 day period to the number of days worked in the partial week for the covered classification.

    a) If x is <0.5, drop the value.

    b) If x is ≥ 0.5, make a whole day off required.

$$\frac{x}{y} = \frac{z}{7}$$

where x = Required days off for partial week
y = Number of days worked in partial week
z = Number of required days off in seven (7) days

5.1.11 Self-Declaration

a. All workers shall have the right to self-declare.

b. If called to come into work, the worker should inform the supervisor placing the call that he or she is unfit for duty due to fatigue or stress.

    1. Security personnel shall immediately report to their immediate supervisor, or the security watch commander, if any instances arise while performing work that may cause them to be unfit for duty due to fatigue or stress.

c. If a worker is working under a waiver and declares he or she is too fatigued to safely perform their duties, they shall be removed immediately from risk significant duty, unless the worker is required to continue performing that duty under other requirements.

    1. If the worker shall continue performing the risk significant duty, the station shall take immediate action to relieve the worker.

d. If a worker declares he or she is too fatigued to safely perform their duties during any part of the assigned work schedule, a fatigue assessment shall be performed.

    1. The worker may forego the fatigue assessment if a 10-hour rest break is given before the worker returns to work.

    2. The worker may return to non-risk significant duties if fatigue assessment is satisfactory.

5.1.12 Shift Turnover

a. When calculating breaks, either on-coming or off-going shift turnover may be excluded from the calculation of a worker's work hours, but not both.

    1. Turnover on both ends of a shift is excluded except for a Minimum Break Between Shift (MBBS), 10 hour break, and a 34 hour continuous break in 9 days break calculations.

b. Shift turnover includes only those activities that are necessary to safely transfer information and responsibilities between two or more workers between shifts.

c. Shift turnover activities may include, but are not limited to, discussions of the status of plant equipment, and the status of ongoing activities, such as extended tests of safety systems and components.

1. Shift turnover may include the time required for security personnel to arm and disarm.

d. Work hours worked during turnovers between workers within a shift period due to rotations or relief within a shift shall not be excluded.

1. Other activities that shall not be excluded from work hours calculations include, but are not limited to:

a) Shift holdovers to cover for late arrivals of incoming shift members

b) Early arrivals of workers for meetings, training, or pre-shift briefings for special evolutions

c) Holdovers for interviews needed for event investigations.

e. Time should be accounted for in 15 minute increments.

5.1.13 Training

a. All site personnel shall receive FMR CBT training as part of the badging and access process.

1. All directors, managers, and supervisors shall receive training on their specific areas of the FMR procedure.

2. All Shift Managers, security watch commanders, and site senior-level managers shall receive training to delineate and define conditions adverse to public health and safety and plant security. Refer to Attachment 2 for guidance on such conditions.

5.1.14 Transition to Covered Work

a. A worker transitioning from non-covered work to covered work shall meet all requirements for the covered worker:

1. The worker shall meet the MDO requirements for the work group he or she is entering.

2. The worker shall have had a continuous 34 hour break in the previous 9 days.

3. The worker shall have a 10 hour break before starting covered work.

4. A look-back shall be performed to ensure the worker has not exceeded maximum working hours in the past 7 days and the 54 hour average has or will not be exceeded for the cycle.

    a) This may also include AVG 54 requirements for the cycle.

5. A look ahead shall be performed to ensure MDO requirements are met for the covered work group entered.

b. Contractors or vendors performing covered work shall:

1. Follow work hour rules in this procedure.

2. Not count their work hours and days off prior to arriving on site.

5.1.15 Waivers

a. Waivers are only applicable to covered workers performing covered work. Examples of instances that would most likely meet the threshold for a waiver include:

1. A safety-related SSC fails placing the unit in a shutdown LCO.

2. A worker, who is part of the minimum shift complement, must be held over due to relief not available.

b. A list of authorized waiver issues is provided in Attachment 2.

c. Staffing levels should be sufficient so that schedules for covered workers may be maintained based on vacation and training demand without relying on waivers.[Ref 7.5]

1. While it is expected and allowed that normal variation in vacation and training demand may occasionally require additional work hours to be used, management shall consider the total vacation, training, and workload demands in order to maintain sufficient staff to execute work.[Ref 7.5]

d. When informed in writing by the NRC that the FMR requirements are waived for security personnel to ensure common defense and security, the requirements specified in the FMR do not apply for the duration of the period defined by the NRC.

e. Waiver Requirements

1. Waivers shall be granted on an individual basis and only to address circumstances that could not have been reasonably controlled.

2. Waivers may be granted if either:

    a) A Shift Manager, with concurrence from a site senior-level manager, determines that the waiver is necessary to mitigate or prevent a condition adverse to safety.

    b) The security watch commander, with concurrence from a site senior-level manager, determines that the waiver is necessary to maintain site security.

    c) A site senior-level manager determines if a waiver is necessary to mitigate or prevent a condition adverse to safety or to maintain site security.

3. The cognizant supervisor shall perform a face-to-face waiver assessment on the worker to determine if there is reasonable assurance that the worker will be able to safely and competently perform assigned duties during the additional work period for which the waiver will be granted.

    a) The supervisor performing the waiver assessment shall be FFD qualified.

    b) The supervisor performing the waiver assessment shall be qualified to direct the work (or related work) to be performed by the worker.

        1) If there is no supervisor on-site who is qualified to direct the work, the assessment may be performed by a trained supervisor who is qualified to provide direction of the work to be performed by the worker.

    c) Waiver assessments prior to the worker performing any work under the waiver shall be performed no more than 4 hours before the work activity.

    d) At a minimum, the waiver assessment shall address:

        1) The potential for acute and accumulative fatigue considering the worker's work history for at least the past 14 days.

        2) The potential for circadian degradations in alertness and performance considering the time of day for which the waiver shall be granted.

        3) The potential for fatigue-related degradations in alertness and performance to affect risk-significant functions.

        4) Whether any controls and conditions are required under which the worker shall be permitted to perform work.

4. The documented basis for a waiver shall include:

   a) The circumstances that necessitate the waiver.

   b) A statement of the scope of work.

   c) A time period for which the waiver is approved.

   d) The bases for the approval of the waiver.

5. Waivers shall be tracked in the corrective action program.[T34188]

6. The station does NOT need to meet the waiver requirements during declared emergencies as defined in the Emergency Plan or unannounced ERO drills.

   a) After a declared emergency or unannounced drill is terminated, employees require a 10 hour break before the start of the next shift to reset their FMR hours.

   b) Employees require a 34 hour break before the start of the next shift if they have not had a 34 hour break in the previous 9 days.

7. Waivers are not required for changing to and from daylight savings time.

f. Waiver Process

   1. Only one work period shall be waivered per FMR Waiver Form, Form 69-21349.

   2. Immediate supervisor shall complete a FMR Waiver Form.

      a) List the condition adverse to safety or site security requiring resolution.

   3. Shift Manager or security watch commander, with concurrence from a site senior-level manager, shall authorize a FMR waiver on the FMR waiver form.

   4. If condition is determined to NOT be a condition adverse to safety or site security, the waiver is not valid and FMR work hour limits shall not be exceeded.

5. Once the Shift Manager, security watch commander, and designated site senior-level manager authorizes the waiver, the immediate supervisor shall:

    a) Perform a face-to-face supervisory assessment on the worker no more than 4 hours prior to exceeding FMR work hour limits using the following guidance:

        1) Potential for acute fatigue—time since last 10 hour break.

        2) Potential for cumulative fatigue—review 14-day work history.

        3) Consider if the worker had adequate opportunity to obtain sufficient rest considering the length and sequencing of break periods, available sleep periods, and transitions that may have interfered with quality sleep.

        4) Circadian factors—time of day and recent work cycle.

        5) Consider the time of day/night the work will be performed relative to the worker's recent shift schedules.

        6) Observation and statements of the worker.

        7) How fatigue could affect the work quality, if at all.

        8) Nature of work to be performed.

    b) Document the supervisory assessment.

    c) Determine if there is reasonable assurance that the worker will be able to safely and competently perform assigned duties during the additional work period for which the waiver will be granted.

    d) Determine if there should be any restrictions on the worker that will be assigned duties during the additional work period for which the waiver will be granted.

    e) Document the reasonable assurance determination and any restrictions.

    f) Initiate a tracking notification. One notification per waiver is created with work type of "PROG FMR."

6. Worker shall sign the FMR waiver form agreeing they are fit for duty to conduct the planned work under waiver.

7. The immediate supervisor shall perform closeout review promptly after the waiver period and complete the close out section of the FMR waiver form.

5.1.16 Work Hours

a. Work hour controls apply only to unescorted employees, contractors, or vendors performing or on-site directing covered work. Refer to step 5.1.16e for work hour control exemptions.

b. All hours worked at any nuclear station shall be counted as hours accumulated toward the work hour limitations specified for covered workers.

c. Work activities on both risk-significant and non-risk-significant SSCs contribute towards fatigue; therefore, all work hours shall be considered in the accumulated time related to work hour limitations.

d. Reviews shall be performed annually to evaluate effectiveness of work control hours.

1. If any plant or security system outages or increased threat conditions occurred since the most recently completed review, include in the review an evaluation of the work control hours during outages or increased threat conditions.

2. The review shall be completed within 30 days of the end of the review period.

3. The review shall include:

a) Actual work hours and performance of workers subject to this requirement.

b) Information from the corrective action program.

c) At a minimum, provide:

1) Workers whose actual hours worked during the review period exceeded an average of 54 hours per week in any evaluation period while the worker's work hours are subject to the FMR.

2) Workers who were granted more than one waiver during the review period.

3) Workers who were assessed for fatigue during the review period.

d) Worker's hours worked and the waivers under which work was performed to evaluate staffing adequacy for all jobs subject to the work control hours.

4. Document the methods used to conduct the review and the results of the review in a SAPN.

5. Document in the corrective action program any problems identified in maintaining control of work hours consistent with the specific requirements and performance objectives.

e. Work hour controls do not apply to the following individuals and activities:[Ref 7.5]

1. Maintenance activities on Maintenance Rule SSCs located off site.

2. Quality control and quality assurance activities.

3. Predictive maintenance activities that do not result in a change of condition or state of an SSC that a risk-informed evaluation process has shown to be significant to public health and safety may be excluded from covered work.

NOTE:	At times an activity requires starting or stopping a piece of equipment. The worker starting or stopping the equipment would be performing covered work under the operating category; however, the data collection would not be considered covered work.

a) Examples of activities that may be excluded if they do not change the state or condition of these SSCs include, but are not limited to:

1) Nondestructive Examination (NDE)

2) Thermography

3) Vibration analysis

4) Data collection and analysis

5) Reactor engineering analysis

4. Contractors or vendors, who are not granted unescorted access, conducting work on a risk-significant SSC on site.

5. Contractors or vendors making recommendations to plant personnel.

6. Emergency response personnel who do not perform radiation protection or chemistry duties required as a member of the on-site emergency response organization minimum shift complement.

7. Technical staff making recommendations to other plant personnel.

5.1.17 Work Hour Calculations

a. Work hour limits and the associated calculation and tracking of work hours apply to the workers performing covered work.[T34188]

1. This calculation includes both covered and non-covered work since the latter also contributes to fatigue.

b. Work hour accounting practices may be different from record keeping for payroll purposes or gate times.

c. Work hour records should show the number of hours worked each calendar day.

1. Work period start and stop times should be recorded and documented in a consistent manner.

d. Covered workers performing work while off-site shall report hours worked to the cognizant supervisor upon returning on-site.

1. The cognizant supervisor shall ensure any hours worked in excess of the schedule are included into the electronic tracking software.

2. The worker shall be aware of work hour restrictions and not exceed the restrictions without an approved waiver.

e. The calculated work hours shall include all time performing duties for work, including all within-shift break times and rest periods during which there are no reasonable opportunities or accommodations appropriate for restorative sleep. Work hours include but are not limited to:

1. Shift holdovers to cover for late arrivals of incoming shift members.

2. Early arrivals of workers for required meetings, training, or pre-shift briefings for special evolutions (these activities are not considered shift turnover activities).

3. Holdovers or early arrivals for interviews needed for event investigations.

4. Call-in work periods. The time between leaving the station and the call-in work period are also included if that time is less than 10 hours in duration.

f. That portion of a break or rest period during which there is a reasonable opportunity and accommodations for restorative sleep (e.g., a nap) may be excluded when calculating a worker's work hours.

g. Personal time in which an individual is on-site but is off duty (i.e., before or after his or her normally scheduled work period in which work activities are performed) may be excluded.

h. If a worker begins or resumes performing covered work during the calculation period, include in the calculation all hours worked, including hours worked performing non-covered work.

1. Control the worker's work hours per the requirements of this procedure.

i. Incidental unscheduled duties performed off-site (e.g., technical assistance provided by telephone from a worker's home), provided the total duration of the work does not exceed a nominal 30 minutes during any single break period, may be excluded.

1. The term "unscheduled" is an integral part of the definition of "Incidental Duties". Once an activity is scheduled it no longer can be called an incidental duty and therefore the 30 minute time limit no longer applies and every minute a worker is performing the activity must be tracked in Workforce as time worked.

2. For the purposes of compliance with the minimum break requirements and the minimum day off requirements, such duties do not constitute work periods or work shifts if the nominal 30 minutes is not exceeded.

3. Time spent on incidental duties is cumulative.

a) The cumulative 30 minutes impacts the break period where the nominal 30 minute limit is exceeded.

j. Contractors or vendors shall track and report their hours to their supervisors between outages.

5.1.18 Work Hour Scheduling

a. Unscheduled work hours for the purpose of participating in unannounced emergency preparedness exercises and drills may be excluded when calculating actual hours worked.

1. After a declared emergency or unannounced drill is terminated, employees require a 10 hour break before the start of the next shift to reset their FMR hours.

2. Employees require a 34 hour break before the start of the next shift if they have not had a 34 hour break in the previous 9 days.

b. Work hours for covered workers shall be scheduled with the objective of preventing impairment from fatigue due to duration, frequency, or sequencing of successive shifts.

c. Supervisors should consider the following factors when establishing schedules:

   1. Work hour limits

   2. Consistent start and stop times for work periods

   3. Impact of shift rotations

   4. Training requirements

   5. Vacation scheduling

d. To determine if a worker may be called in to work, use the following guidelines to determine if the work hour limit will be exceeded.

   1. Hours worked should be evaluated to determine if any limit will be exceeded based on the work schedule by a backward look at the number of hours that have or will have been worked based on a time in the future (i.e., if the worker works at time T, how many hours will he or she have worked in the 24 hours/48 hours/7 days preceding time T relative to work hour limits as well as minimum days off and break requirements).

   2. When entering an unplanned outage, compliance with work hour limits is met if the schedule for the evaluation period would have provided the required average minimum days off.

   3. Deviations from overtime limits may occur as the result of administrative errors or unforeseen circumstances. A notification shall be initiated for each worker if this occurs.

      a) If an employee is actively engaged in covered work, remove the employee from covered activities at the earliest possible safe time to do so.

      b) If a waiver is warranted and no other work hour compliant individual is available to perform the work, process a waiver per step 5.1.15 prior to continuing.

      c) If the employee is not able to work under a waiver, safe transport home should be considered.

NOTE:	A worker is considered "reset" from deviation, whether under a waiver or otherwise, when they meet the hours worked and break requirements in step 5.1.7.

5.1.19 For the purposes of compliance with the maximum average hours worked requirements, supervisors may exclude shifts worked by security personnel during actual conduct of force-on-force tactical exercises evaluated by the NRC when calculating worker's number of days off.

a. Work hour requirements do not apply when informed in writing by the NRC that these requirements, or any subset thereof, are waived for security personnel in order to assure the common defense and security, for the duration of the period defined by the NRC.

5.1.20 Work Performed Off-Site

a. Work hours for unscheduled work performed off-site may be excluded from the calculation of a worker's work hours unscheduled work performed off-site (e.g., technical assistance provided by telephone from a worker's home) provided the total duration of the work, which is required by the leader, does not exceed a cumulative 30 minutes during any single break period.

b. For the purposes of compliance with the minimum break requirements and the minimum day off requirements, such duties do not constitute work periods or work shifts.

c. After hours study time that is not required by the company may be excluded from work hour calculations.[Ref 7.5]

1. As with any academic setting and curriculum, after hours study time varies from worker to worker.

2. Appropriate after hours study time compliments the utility provided training to ensure the learning process occurs and optimal information retention is achieved.

d. When considering work hour extensions for workers performing covered work, all hours worked by the worker shall be included. For example:

1. If a worker has performed 15 hours of non-covered work, and the worker is needed to perform additional covered work that extends beyond 16 hours in a 24 hour period, then a waiver to exceed the work hour limits shall be approved prior to the worker exceeding the 16 hour limit.

2. On the other hand, if the worker has performed 14 hours of covered work, and is needed to perform additional non-covered work, then the programmatic approvals of this document do not apply. However, the additional work hours are included in consideration of any other limits if the worker subsequently performs covered work.

5.1.21 Work Week Schedule

a. Supervisors shall review the actual hours worked and the performance of the workers subject to the FMR.

1. At a minimum, the review shall address:

a) Workers whose actual hours worked during the review period exceeded an average of 54 hours per week in any evaluation period while the workers' work hours are subject to the requirements of the FMR.

2. Use the Corrective Action Program to identify and evaluate the conditions which lead workers to work an average of more than 54 hours per week within an evaluation period.

b. An evaluation period shall not exceed six weeks for the purposes of calculating maximum average hours worked.

1. Each department should follow evaluation periods as defined in their respective labor agreements.

c. An eight (8) hour shift schedule is a schedule that shall not average more than nine (9) hours per workday over the entire evaluation period.

d. A ten (10) hour shift schedule is a schedule that shall not average less than nine (9) hours, but not more than eleven (11) hours, per workday over the entire evaluation period.

e. A twelve (12) hour shift schedule is a schedule that shall average more than eleven (11) hours, but not more than twelve (12) hours, per workday over the entire evaluation period.

5.2 Non-Covered Workers

5.2.1 Non-Covered Worker Requirements

a. Non-covered workers should arrive for work fit for duty and avoid fatigue in order to safely perform their duties.

b. Non-covered workers with unescorted access to the plant shall be subject to the requirements of 10 CFR 26.

c. Non-covered workers performing or directing non-covered work are normally expected to follow the FMR guidelines for minimum days off, overtime limits, and breaks associated with the maintenance organization.

d. Non-covered workers performing or directing non-covered work who enter time in the electronic time keeping system will receive warnings when the FMR is at risk of being exceeded; however, such warnings will not be identified or recorded as violations of the FMR.

e. Manager or higher level should approve non-covered workers exceeding FMR guidelines.

1. Non-covered workers should obtain such approval prior to exceeding the guidelines.

2. Managers who are non-covered workers should receive approval from a site senior-level manager prior to exceeding FMR guidelines.

3. Site senior-level managers who are non-covered workers do not require approval to exceed FMR guidelines.

f. Manager or higher level shall review and approve changing any covered worker to a non-covered worker status.

5.2.2 Non-Covered Worker Limits

a. Workers performing non-covered work shall obtain written approval from a vice president nuclear generation prior to working more than 20 consecutive work days.

1. Workers shall take two consecutive days off prior to returning to work.

b. Supervisors performing non-covered work shall obtain written approval from a vice president nuclear generation, the Station Director, prior to exceeding 13 consecutive work days.

5.3 Contractor/Vendor Work Hour Management Programs

5.3.1 PG&E may accept a contractor/vendor work hour management program in place of the DCPP program.

a. Contractor/vendor shall submit fatigue management procedure(s) and a description of software tool to PG&E for review and approval.

b. Contractor/vendor representative shall provide work hour monitoring reports on a weekly basis to the PG&E contract technical coordinator.

c. Contractor/vendor representative shall notify the PG&E contract technical coordinator of any potential work hour violations before the violation actually occurs.

d. The PG&E director responsible for implementation of the Fatigue Management Program shall approve the Contractor/Vendor Program before it is used.

e. The contractor/vendor shall notify the PG&E contract technical coordinator of any contractor/vendor fatigue management procedure or fatigue management software changes before they are implemented for use for work completed at DCPP.

f. Contractor/Vendor Program changes reported to the PG&E contract technical coordinator shall be approved for use by the PG&E director responsible for implementation of the Fatigue Management Program before implemented at DCPP.

6. RECORDS

6.1 Records generated by the use of this procedure include non-training records associated with work hour and related activity tracking, and training records.

6.2 Non-Training Records

6.2.1 Records generated through the implementation of this procedure include the following:

a. Records of work hours for workers who are subject to the work hour controls.

b. Records of shift schedules and evaluation periods of workers who are subject to the work hour controls.

c. The documentation of waivers including the bases for granting the waivers.

d. The documentation of annual work hour reviews including:

1. Documentation of the methods used to conduct the reviews.

2. Results of the reviews.

3. Documentation of any problems found during the reviews.

4. Actions taken under the corrective action program.

e. The documentation of fatigue assessments including assessments related to self-declarations.

6.2.2 The non-training records noted above shall be retained for three (3) years.

a. If there are legal proceedings related to fatigue management in progress at the end of the three year retention period, records shall be retained until the completion of all related legal proceedings.

b. These records do not meet the definition of quality records and therefore do not need to be retained in the records management system.

c. Non-training records may be retained by the department generating the documentation or the payroll group.

d. Non-training records may be generated in hardcopy format or retained electronically using a computer program.

6.2.3 Non-training records are not considered quality-related records.

6.3 Training records associated with fatigue management are considered quality related records and therefore shall be retained in the records management system.

7. REFERENCES

7.1 AD3.ID6, "Designation and Protection of Security Information"

7.2 NEI 06-11, "Managing Personnel Fatigue at Nuclear Power Reactor Sites"

7.3 NEI 06-11, Addendum, "Implementation Guidance for Maximum Average Work Hours Alternative"

7.4 NRC Regulatory Issue Summary 2011-08, "Fatigue Management During Hurricane Conditions"

7.5 Regulatory Guide 5.73, "Fatigue Management for Nuclear Power Plant Personnel"

7.6 10 CFR 26 Subpart I, "Managing Fatigue"

7.7 SAPN 50890593 "No Annual fatigue assessment summary created"

8. Turnover Time

8.1 The following table provides examples of acceptable and unacceptable turnover time activities.

Table 2: Turnover Time

ACCEPTABLE	UNACCEPTABLE
• Exchanging information with your supervisor, peer, or crew • Exchanging information with personnel assuming job duties or responsibilities (During watch or job turnover requiring two people, both are considered on turnover time.) • Familiarizing yourself with your areas of responsibilities • Crew briefing • Discussing safety issues (safety meeting, safety concern, etc.)	• Authorizing or directing work assignments • Performing repairs • Performing a test • Reviewing test data • Monitoring work activities • Standing a watch • Attending training • Attending section meetings • Reviewing an order for closure • Taking a welder qualification test • Obtaining and carrying materials and tools to the work area • Investigative interviews

8.2 A director, manager, Shift Manager, or security watch commander shall preauthorize other activities that may fall within the definition of turnover time but are not listed above.

Maintenance Rule Risk Significant Systems

Attachment 1: Page 1 of 1

SYSTEM	SUBSYSTEM	NAME
03B	01 02 03	AUXILIARY FEEDWATER
04B	01 02 05 07 08 09	TURBINE STEAM SUPPLY-UPSTREAM MSIV
04C	04	TURBINE STEAM SUPPLY-S/G BLOWDOWN
07A	01 02 04	RCS
08A	01 02 04 05 07	CVCS
09	01 02 03 05	SI
10	01 02 04 05	RHR
12	01 02	CONTAINMENT SPRAY
14	01	CCW
16A	01	SAFETY RELATED MU WATER
17B	01 02	AUX SALTWATER
21A	01	D/G
21B	01 02	D/G FUEL TRANSFER
23B	01	MAIN AUX BLDG HVAC
23C1	01	MISC AUX BLDG HVAC
23F1&2	01	CONTROL ROOM HVAC
24	01	GASEOUS RADWASTE
25B	01	BACKUP AIR & N2
36	01	EAGLE 21
37	01	NUCLEAR INSTRUMENTATION
38	01	SSPS
41A	01 02	CONTROL ROD-MECHANICAL
41B	01	CONTROL ROD-ELECTRICAL
45B	01	CONTAINMENT ISOLATION VALVES
62	04	12KV
63A	01	4KV VITAL BUSSES
63B	02	4KV NON-VITAL
64A	01	480V VITAL
65A	01	120V VITAL AC
67A	01 03	125VDC VITAL
69	01	230KV
80	01 02	CIVIL STRUCTURES
95	01	NUCLEAR FUEL
99	FLOCS	ASSOCIATED WITH THE PROCESS CONTROL SYSTEM (PCS)

Conditions Adverse to Safety or Site Security **Attachment 2: Page 1 of 1**

1. Conditions adverse to safety or site security are unforeseen conditions which, in the informed opinion of the duty Shift Manager or security watch commander, could jeopardize the safety or security of the public, station, personnel, or environment.
2. Waivers are considered appropriate if required to mitigate conditions adverse to safety or site security. If rule compliance could result in the following, but not limited to, type conditions, it would be appropriate to consider using the waiver process:
   a. Violate other NRC requirements such as minimum on-site staffing.
   b. Jeopardize the industrial or radiological safety of the public or plant personnel.
   c. Delay recovery from a challenge to a safety system function, if the compliance with the FMR would cause a forced reactor shutdown, power reduction, or other similar action as a result of exceeding a time limit for a Technical Specification Limiting Condition for Operation.
   d. Delay in recovering from actual or potential loss of reactor core cooling capability during outages.
   e. Cause a forced reactor shutdown, power reduction, or similar action as a result of exceeding a time limit for a Technical Specifications Limiting Condition for Operation.
   f. Result in an increase in Core Damage Frequency of greater than 1.0E-6, or similar program risk profile.
   g. Cause or prevent mitigation of an environmental permit violation.
   h. Compromise the ability to maintain the site secure from the actions of malicious groups or persons
   i. Force undue risk to on-site or off-site station personnel as a consequence of an external event (e.g., security, fire, or severe weather).

Fatigue Management Rule Waiver Form

Authorization to Waive Worker Work Hour Limits

This attachment should only be used if database is not available.

Date: Time:	Notification No.	Unit Status (check one) [ ] Outage [ ] Non-Outage

Waiver Period: Waiver Start: _____/_____ Waiver End: _____/_____
Date / Time Date / Time

NOTE: Only one work period shall be waivered per waiver form.

The following person is authorized to exceed the limits of 10 CFR 26

Print Name: (last, first)	Limits (see below)	Additional Time Authorized or Actual Break (see below)	Work Activity			
			OPS	HP/CHEM	MNT	SEC
LAN ID:						

Enter the letter code(s) for each of the applicable limits being exceeded under "Limits."

A. More than 16 hours in any 24-hour period (MWH16/24)
B. More than 26 hours in any 48-hour period (MWH26/48)
C. More than 72 hours in any 7 day period (MWH72)
D. Fewer than 10 hours between work periods (MBBS10)
E. Less than 34 hour break in the last 9 days (MBBS34/9)
F. More than 54 hours in a rolling 6 week period (AVG 54)
G. Minimum days off for outage requirements not met (MDO-OUT)

Enter the hours/day in excess of the appropriate limit in the "Additional Time Authorized/Actual Break" column.

Justification for exceeding work hour limits:

Description of work to be performed:

Circumstances that caused work hour extensions:

[ ] ERO Minimum Shift Staffing

[ ] Condition Adverse to Safety SAPN/Order Number: _____Order Priority: ___

[ ] Security Threat or Security Outage:

[ ] Necessary to maintain site security (explain):

Authorization to Waive Worker Work Hour Limits

If the worker will not be in compliance with the work hour limits when they return to work on their next scheduled day of work, then a new authorization to waive the worker work hours, including a new fatigue assessment, must be completed prior to allowing the worker to return to work.

Worker's work schedule has been checked and worker has been notified when he or she can return to work:
[ ] YES [ ] NO
Comments:

Waiver requested by: (Work supervisor or supervisor familiar with work to be performed)

_____/_____/_____
Print Name Signature Date

Waiver authorized by: (Shift Manager, security watch commander, or director or above with requisite signature authority)

_____/_____/_____
Print Name Signature Date

Concurrence by director or above:

_____/_____/_____
Print Name Signature Date

NOTE: Director concurrence may be verbal and/or by telephone, name shall be listed above. If a director authorizes the waiver then no additional concurrence is necessary.

The worker's supervisor will complete Fatigue Assessment per Attachment 4 prior to work beginning.
Fatigue assessment completed: [ ] YES [ ] NO
Comments:

If this waiver was not used, then this attachment should be voided. The voided attachment will not be a QA record and the WorkForce schedule should be updated with actual hours worked.

CLOSE-OUT

Print Name: (last, first)	Hours Worked under this waiver	Was work performed satisfactorily?	Database Updated?
LAN ID:		[ ] YES [ ] NO	[ ] YES [ ] NO

Comments:

Closed by:

_____/_____/_____
Job Supervisor Signature Date

Retention Instructions:
Department - Attach this form to electronic waiver.

Fatigue Assessment Form

Fatigue Assessment

Name:	Badge Number:	Fatigue Assessment or Waiver ID Number:

This assessment is intended to determine whether a degradation in a worker's cognitive and motor functioning have occurred due to the lack of rest and where fatigue is identified, establish appropriate controls and conditions ensuring the worker can safely and competently perform assigned duties. **Completed assessment shall be maintained as confidential.** As request, workers shall provide complete and accurate information necessary to address acute and cumulative fatigue and circadian variations in alertness and performance.

PART A	**Assessment of Fatigue and Work Hours**	**To be completed by worker being assessed.**

Assessment Type (check one)

[ ] WORK HOUR WAIVER	**[ ] FOR CAUSE**	**[ ] POST-EVENT**	**[ ] FOLLOW-UP**	**[ ] SELF-DECLARATION**
Assessment cannot be conducted more than 4 hours before the worker begins performing any work under the waiver.	Include description of observed behavior and name of worker who observed condition in comments.	Include description notification number of event and worker's involvement in comments.	Required when a worker is returned to work after a break of less than 10 hours following a for cause or self-declaration fatigue assessment.	Checking this box, completing this section and signing below indicates a formal self-declaration of fatigue.

Work history of the last 14 days to assess acute and cumulative fatigue and circadian variation in alertness and performance. This information is available from WorkForce on the waiver tab.

Past 14 day work history		14	13	12	11	10	9	8	7	6	5	4	3	2	1
Shift Schedule	Record D for days, N for nights or S for swing														
Hours Worked	Only include one shift turnover for time period														
34-hour break	Check the boxes of those days you've had a break of at least 34 hours before shift.														

Have you had a break of at least 10 hours between successive work periods in the last 14 days (or at least 8 hours if you were transitioning between shifts)? [ ] YES [ ] NO

Have all duties you've performed off-site, if applicable, met the definition of incidental (e.g., technical assistance provided by telephone from a worker's home)? [ ] YES [ ] NO [ ] N/A

How many hours of sleep have you had in the past 24 hours?

How many hours have you been awake?

How many hours of sleep have you averaged each day in the last 9 days?

Describe the work activity you are performing.

Do you feel you can perform this work activity without additional oversight? [ ] YES [ ] NO

Comments:

(Continued on page 2)

Fatigue Assessment

PART A (continued)

Are you mentally alert? [ ] YES [ ] NO
Comments:

Did factors outside of work keep you from obtaining adequate and regular rest (e.g., illness, family personal obligations)? [ ] YES [ ] NO
Comments:

Completed by: _____/_____/_____
Print Name Signature Date

PART B	**Supervisor Face-to Face Fatigue Assessment**

BOP supervisor directing or overseeing assessed worker: _____/_____
(Print Name) LAN ID

As applicable, worker observing the condition of impaired alertness: _____/_____[ ] N/A
(Print Name) LAN ID

BOP supervisor performing fatigue assessment: _____/_____
(Print Name) LAN ID

Assessment Guidelines:

- Only BOP supervisors with current plant access authorization may conduct fatigue assessments.
- If this assessment is for a waiver, it shall not be performed more than 4 hours before the start of the extended work period.
- When a fatigue assessment is conducted "For Cause," the person who observed the condition of impaired alertness shall not conduct the fatigue assessment.
- In the case of a post-event fatigue assessment, the worker who conducts the fatigue assessment may not have:
  - Performed or directed (on site) the work activities during which the event occurred.
  - Performed, within 24 hours before the event occurred, a fatigue assessment of the workers who were performing or directing (on site) the work activities during which the event occurred.
  - Evaluated or approved a waiver for any of the workers who were performing or directing (on site) the work activities during which the event occurred, if the event occurred while such workers were performing work under that waiver.
- For items below as appropriate, interview/observe worker and review worker's assessment/documents to determine whether additional controls and conditions are necessary to address fatigue.

Fatigue Assessment Basis: Describe observed behavior or self-declared conditions leading to assessment. Minimally state the category of duties (Ops, Maintenance, HP, Chemistry, Security, or other) the worker was performing and whether the worker was performing outage activities.

Comments:

(Continued on page 3)

Fatigue Assessment

PART B (continued)

Acute Fatigue Indicators: (Fatigue cause occurring within last 24 hours/since last 10 hour break)

1. Was sleep restricted within last 24 hours? [ ] YES [ ] NO
   Comments:
2. Has worker been awake > 16 hours? [ ] YES [ ] NO
   Comments:
3. Did tasks at or away from work require physical exertion? [ ] YES [ ] NO
   Comments:
4. Does worker appear intoxicated? [ ] YES [ ] NO
   Comments:
5. Sleepiness-yawning, tired eyes, legs? [ ] YES [ ] NO
   Comments:
6. Rubs face with hands often? [ ] YES [ ] NO
   Comments:
7. Poor communication/decisions? [ ] YES [ ] NO
   Comments:
8. Bad mood, apathetic, fixated? [ ] YES [ ] NO
   Comments:

Observe worker and review Section A completed by the worker:
Comments:

Cumulative Fatigue Indicators (Increases in fatigue over consecutive sleep-wake periods resulting from inadequate rest)

9. Was sleep restricted between any changes in shift schedules within the last 14 days? [ ] YES [ ] NO
10. Did worker experience sustained wakefulness within last 14 days (were length of sleep periods reduced as work week progressed)? [ ] YES [ ] NO
11. If worker has sleep debt, has worker been unable to catch-up depleted sleep between shifts or on off-periods? [ ] YES [ ] NO [ ] N/A
12. Has worker experienced any personal issues or other factors that may impact his or her ability to obtain adequate sleep within last month? If so, when? Describe impact. [ ] YES [ ] NO
13. Has worker lacked initiative or creativity? [ ] YES [ ] NO
14. Has worker's work schedule during past 14 days prevented opportunity to obtain sufficient rest? [ ] YES [ ] NO

Comments:

(Continued on page 4)

Fatigue Assessment

Circadian Rhythm Considerations
(changes in alertness and cognitive/motor functioning related to approximate 24-hour cycle)

Is worker on day, afternoon or evening shifts? [ ] Day Shift [ ] Afternoon Shift [ ] Evening Shift

15. Is worker experiencing or exhibiting fatigue symptoms during possible physiological alertness low points (01:00 - 04:30 or 13:30 - 15:30)? [ ] YES [ ] NO
16. Is worker's rest/sleep being interrupted by external time cues such as light and social activity? [ ] YES [ ] NO

Potential Effect of Fatigue on Work Quality (What risk significant function could be impacted during this activity, i.e., reactivity management, radioactive release, pressure boundary, containment isolation/integrity, off site power, core cooling, decay heat removal? Consider quality barriers such as post maintenance testing, independent verifications, hold points, or surveillance testing.)

Nature of Work to be Performed (What environmental conditions exist that could increase fatigue? Is task repetitive? Does task have high mental focus or attention demands? Will there be social interaction?)

Assessment Results Based on your review and the fatigue assessment, you will need to determine if the individual can work without restriction (PASS), work with restrictions (PASS RESTRICTED) or not be able to continue to work (FAIL). The decision takes into consideration answers to questions B1 through B16, the answers to these questions are counted and assist with determining the assessment result. The score guidelines listed with the outcomes are to be utilized unless the individual performing the assessment determines a more restrictive outcome is indicated.

[ ] **PASS**	Worker does not exhibit signs of impairment due to fatigue and may continue to work with no additional controls or conditions. Select this outcome if there are zero or one "YES" answer on questions B1 through B16 or all answers to questions B1 through B16 are "NO" or "N/A".
[ ] **PASS RESTRICTED**	Worker may continue working under controls and conditions identified in the next block. Select this response if there are 2 or more "YES" responses on questions B1 through B16.
[ ] FAIL	Worker is exhibiting impairment due to fatigue and must be provided a break of at least 10 hours. Select this response if there are five or more "YES" answers on questions B1 through B16.

Fatigue Controls and Conditions (to address fatigue concerns identified above)

[ ] Additional Breaks Required:

[ ] Additional Oversight/Verifications/Peer Checks required:

[ ] Additional Environmental Controls required:

Results of the fatigue assessment have been provided to the assessed worker: Worker's initials_____

If worker advises assessor they do not feel they can continue working, the assessor should notify their supervisor and enter the self-declared fatigue process outline in OM14.ID1.

Initiate a notification: [ ] Notification Number: _____

Supervisor Performing Assessment:

Waived work period begins: _____/_____
Date Time*

_____/_____/_____
Print Name Signature Date/Time*

* If this assessment is for a waiver, it shall not be performed more than 4 hours before the start of the waived work period.

Retention Instructions:
Department - Document creation of this form in a notification and forward original or a copy to the access/FFD manager

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-A2

Title: Estimate Decay Heat and Heat Removal Rate

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform ____X____ Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References: OP AP SD-5, Loss of Residual Heat Removal, Rev. 10

Alternate Path: Yes _____ No ____X____

Time Critical: Yes _____ No ____X____

Time Allotment: 15 minutes

Critical Steps: See task standard

Job Designation: RO

Rev Comments: Revised from Bank LJC-014

Gen KA # / Rating: 2.1.25 – Ability to interpret reference materials such as graphs, curves, tables, etc. 3.9

AUTHOR: **LISA TORIBIO** DATE: **12/03/19**

OPERATIONS REPRESENTATIVE: **CHRIS MEHIGAN** DATE: **12/03/19**

Directions: All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the step at which to begin.

Required Materials:
- Calculator
- OP AP SD-5, Loss of Residual Heat Removal, Rev. 10, Appendix B – Estimation of Decay Heat and Heatup Rate

Initial Conditions: GIVEN:
- Unit 1 was shut down six days ago for a refueling outage
- RCS has been drained to 108' and is being maintained at that level in accordance with OP A-2:III, Reactor Vessel – Draining to Half Loop/Half Loop Operations With Fuel in Vessel
- Core is still loaded
- RHR pump 1-2 just tripped on overcurrent
  - RHR pump 1-1 can NOT be started
  - RCS temperature is 106 ^{o}F
  - NR RVRLIS level is 108'
- The Excel Spreadsheet to calculate heatup rate is unavailable

Initiating Cue: The Shift Foreman has directed you to determine the time to reach 200^{o}F per OP AP SD-5, Appendix B.

NOTE:
- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

NOTE: Do NOT provide examinee with Task Standard

Task Standard:
- **Determined decay heat load is 12.0 MWn(±0.5 MW)**
- **Determined heatup rate was 5.4 ^{o}F (± 0.3)**
- **Determined the time to reach 200^{o}F is 17.4 (±1.0)minutes**

Start Time: _____ **End Time:** _____

Follow up Question Documentation:

Question: _____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

_____

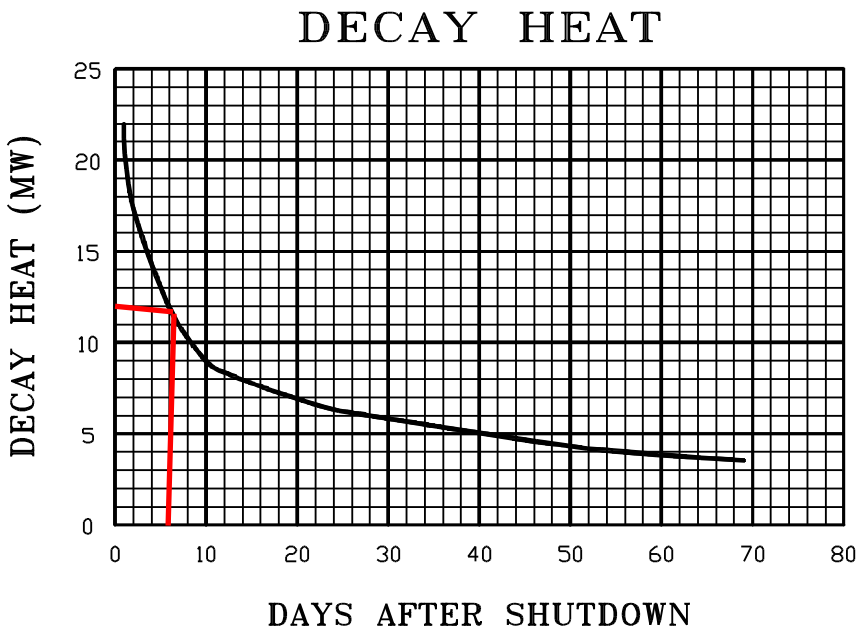
_____

APPENDIX B

Estimation of Decay Heat and Heatup Rate[T31417]

NOTE:	This appendix is normally performed using an Excel spreadsheet. The Excel spreadsheet is more accurate than using this appendix, and also contains time to core uncovery calculations. Use of either this appendix (hard copy) or the Excel spreadsheet is acceptable for determining heatup rates and time to 200°F.

1. PREDICTED HEAT LOAD



2. * REDUCTION FACTOR FOR REFUELED CORES

12.0 (±0.5) MW X	1.0	=	**12.0 (±0.5) - *Critical** MW
Predicted Heat Load	Fraction of Previously Used assemblies Installed in Core *		Estimated Decay Heat Load

* Use 1.0 if unknown

APPENDIX B (Continued)

3. HEAT UP RATE PREDICTION

12.0 (±0.5) MW	X	0.45	=	**5.4 (±0.3)** ***Critical-**	Degrees per
Estimated Decay Heat Load		Inventory Factor		Predicted Heat Up Rate	Minute

a. INVENTORY FACTOR - Degrees/MW Min

107-ft	0.52	
108-ft	**0.45**	
	Nozzle Dams Installed **OR** SG Tubes Voided	**NO** Nozzle Dams Installed **AND** SG Tubes Not Voided
110-ft	0.40	
112-ft	0.36	0.29
114-ft	0.33	0.27
116-ft	0.31	0.26
≥ 118-ft	0.31	0.054

Upper Internals Removed (Use ≥118-ft if Upper Internals Installed)

120-ft	0.06
130-ft	0.03
138-ft	0.02

4. * ESTIMATED TIME TO REACH 200 DEGREES

200		**____94_____** Delta Temp		
-_106__	Existing Temperature	÷	Actual or	= **_17.4 (±1.0)_-** ***Critical**
_94____ Delta Temp		**_5.4 (5.1 – 5.7)__**	Predicted Heat Up Rate	Minutes to reach 200

Initial Conditions:

GIVEN:

- Unit 1 was shut down six days ago for a refueling outage
- RCS has been drained to 108' and is being maintained at that level in accordance with OP A-2:III, Reactor Vessel – Draining to Half Loop/Half Loop Operations With Fuel in Vessel
- Core is still loaded
- RHR pump 1-2 just tripped on overcurrent
  - RHR pump 1-1 can NOT be started
  - RCS temperature is 106 ^{o}F
  - NR RVRLIS level is 108'
- The Excel Spreadsheet to calculate heatup rate is unavailable

Initiating Cue:

The Shift Foreman has directed you to determine the time to reach 200^{o}F per OP AP SD-5, Appendix B.

NOTE:

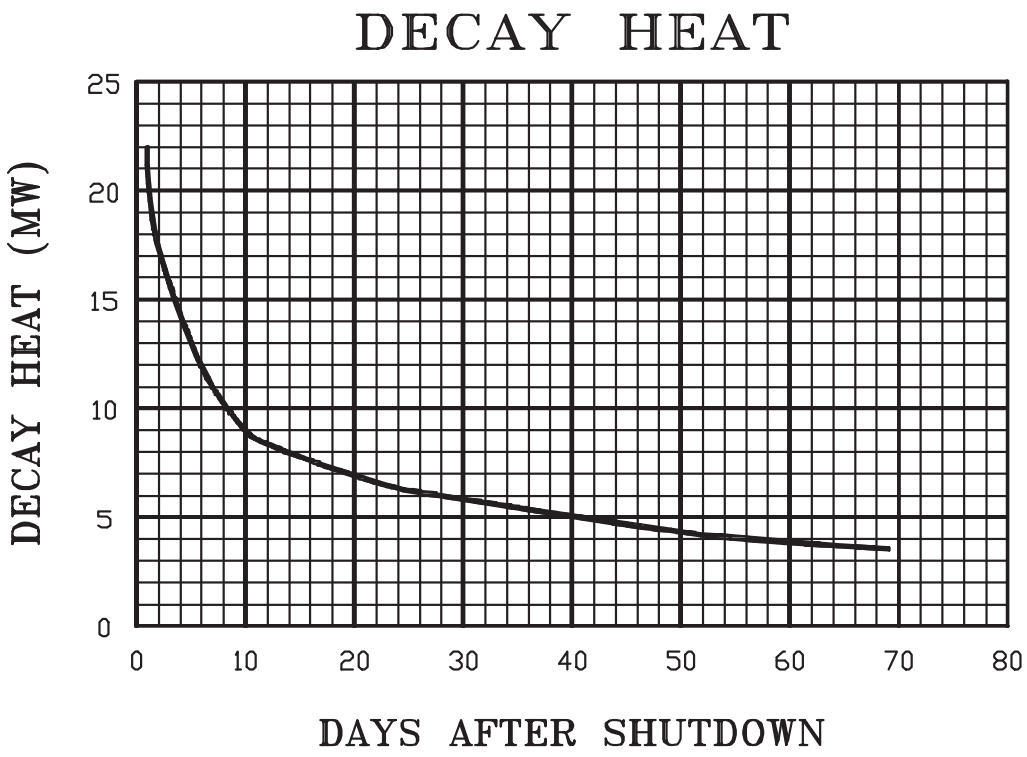
- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

APPENDIX B

Estimation of Decay Heat and Heatup Rate[T31417/T31098]

1. PREDICTED HEAT LOAD



2. REDUCTION FACTOR FOR REFUELED CORES

_____MW	X	_____	=	_____MW		
Predicted Heat Load		Fraction of Previously Used Assemblies Installed in Core *		Estimated Decay Heat Load		

* Use 1.0 if unknown

APPENDIX B (Continued)

3. HEAT UP RATE PREDICTION

_____ MW	X	_____	=	_____ Degrees per Minute
Estimated Decay Heat Load		Inventory Factor		Predicted Heat Up Rate

a. INVENTORY FACTOR - Degrees/MW Min

107'	0.52
108'	0.45

	Nozzle Dams Installed OR SG Tubes Voided	NO Nozzle Dams Installed AND SG Tubes NOT Voided
110'	0.40	-----
112'	0.36	0.29
114'	0.33	0.27
116'	0.31	0.26
≥ 118'	0.31	0.054

Upper Internals Removed (Use ≥118' if Upper Internals Installed)

120'	0.06
130'	0.03
138'	0.02

4. ESTIMATED TIME TO REACH 200 DEGREES

200°		_____ Delta Temp		
- _____ Existing Temperature	÷	Actual or Predicted Heat Up Rate	=	_____ Minutes to reach 200
_____ Delta Temp		_____		

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-A3

Title: Perform STP I-1A

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform __X__ Simulate_____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: Designed for RO candidates in a classroom setting.

References: STP I-1A, Routine Shift Checks Required by Licenses, rev 141

Alternate Path: Yes _____ No _____X_____

Time Critical: Yes _____ No _____X_____

Time Allotment: 20 minutes

Critical Steps: See task standard

Job Designation: RO

Rev Comments: New

Gen KA # / Rating: G2.2.37 - Ability to determine operability and/or availability of safety related equipment 3.6

RON FORTIER DATE: **11/20/2019**
AUTHOR

CHRIS MEHIGAN DATE: **11/26/19**
OPERATIONS REPRESENTATIVE

Directions: All actions taken by examinee should be clearly documented. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure (as applicable) and told the steps with which to begin.

Required Materials: STP I-1A, Routine Shift Checks Required by Licenses, Steps 12.5 and 12.6, rev 141

Initial Conditions: Unit 1 is at 100% power

Initiating Cue: You are instructed to perform STP I-1A, Shift Checks Required by Licenses:

- Step 12.5, RCS Accumulator Volume
- Step 12.6, RCS Accumulator Nitrogen Pressure
- Inform the SFM of the results

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.
- If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

Task Standard:

NOTE: Do NOT provide examinee with Task Standard :

- Step 12.5.3 not met
  - RCS Accumulator 1-2 level change is greater than 3% (5%)
- Step 12.6.2 not met
  - RCS Accumulator 1-2 pressure greater than 640 psig (650 psig)
  - RCS Accumulator 1-3 pressure less than 600 psig (590/585 psig).

Start Time: _____

Stop Time: _____

Follow up Question Documentation:

Question: _____

** Denotes Critical Step and Sub-Steps

12.5 RCS Accumulator Volume - * out of specification

Applicability	Requirement	Parameter
MODE 1	SR 3.5.1.2 SR 3.5.1.4	RCS Accumulator Volume

12.5.1 In table below, record the following:

a. Select indicators used. _glh1__

b. Record levels for indicators selected. _glh1_

c. Record C-2 level from latest STP C-2 volume. _glh1_

RCS Accum.	VB-1 Ind or PPC Point	Current Level (%)	STP C-2 Level	% Level Change
1-1	LI-950 [X] LI950R [ ]	70	- 68	= 2
	LI-951 [X] LI951R [ ]	70	- 68	= 2
1-2	LI-952 [X] LI952R [ ]	73	- 68	= 5 *
	LI-953 [X] LI953R [ ]	73	- 68	= 5 *
1-3	LI-954 [X] LI954R [ ]	68	- 67	= 1
	LI-955 [X] LI955R [ ]	68	- 67	= 1
1-4	LI-956 [X] LI956R [ ]	69	- 69	= 0
	LI-957 [X] LI957R [ ]	69	- 68	= 1

d. Calculate level changes in table above. _glh1_

12.5.2 Check all current RCS accumulator levels are ≥ 59% [52%] AND ≤ 75% [82%]. _glh1_

12.5.3 Check all RCS accumulator level changes are ≤ +3% [+5.6%]. _____

12.5.4 IF draining or filling of accumulator(s) has occurred
OR level increase is unacceptable,
THEN request chemistry to perform STP C-2 within 6 hours for affected accumulator(s). [ ]N/A _glh1_

12.6 RCS Accumulator Nitrogen Pressure *** - out of specification**

Applicability	Requirement	Parameter
MODE 1	SR 3.5.1.3	RCS Accumulator Nitrogen Pressure

12.6.1 In table below, record the following:

a. Select indicators used. _glh1_

b. Record pressure readings for indicators selected. _glh1_

RCS Accumulator	VB-1 Ind or PPC Point	Pressure (psig)
1-1	PI-960 [X] PI960R [ ]	610
	PI-961 [X] PI961R [ ]	610
1-2	PI-962 [X] PI962R [ ]	**650 ***
	PI-963 [X] PI963R [ ]	**650 ***
1-3	PI-964 [X] PI964R [ ]	**590 ***
	PI-965 [X] PI965R [ ]	**585 ***
1-4	PI-966 [X] PI966R [ ]	615
	PI-967 [X] PI967R [ ]	615

12.6.2 Check RCS accumulator nitrogen pressures are ≥ 600 psig [579 psig] AND ≤ 640 psig [664 psig]. _____

12.7 Pressurizer Level Channels

Applicability	Requirement	Parameter
MODE 1	Admin	PPC Pressurizer Level Channels

12.7.1 Check the following PPC Pressurizer Level Channels have a quality code of good (green): _____

- L0480A
- L0481A
- L0482A

12.7.2 IF a quality code is NOT good, THEN document in a notification. [ ]N/A _____

Response:

Examinee Response - Key
See attached marked up procedure

** Denotes Critical Step and Sub-Steps

Initial Conditions: Unit 1 is at 100% power

Initiating Cue: You are instructed to perform STP I-1A, Shift Checks Required by Licenses:

- Step 12.5, RCS Accumulator Volume
- Step 12.6, RCS Accumulator Nitrogen Pressure
- Inform the SFM of the results

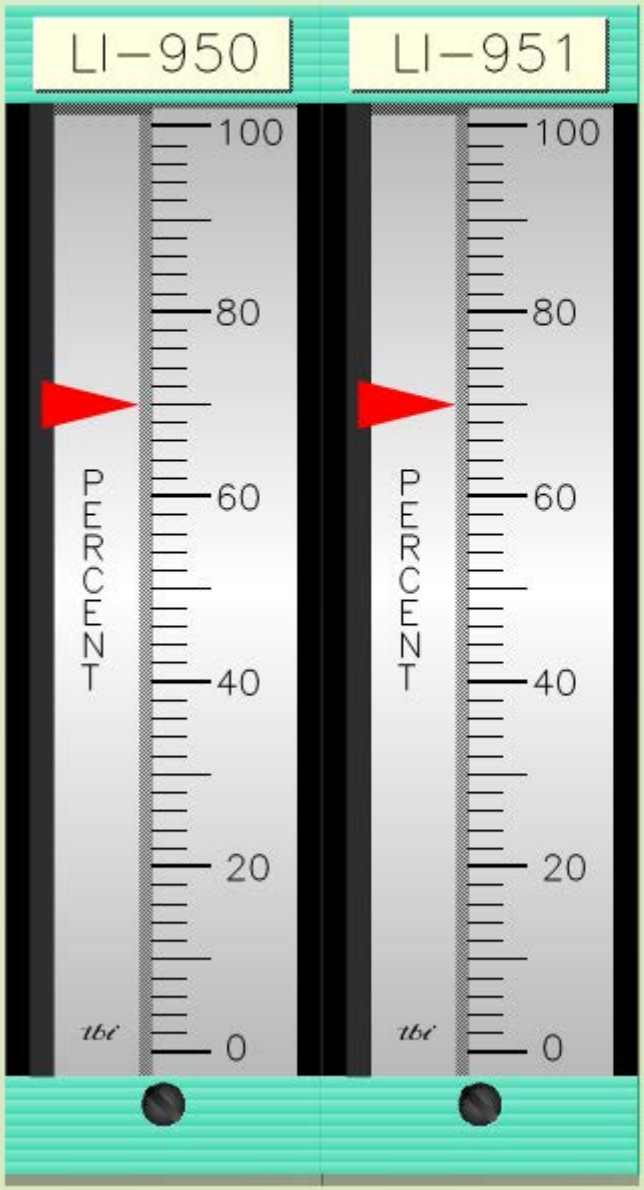
NOTE:

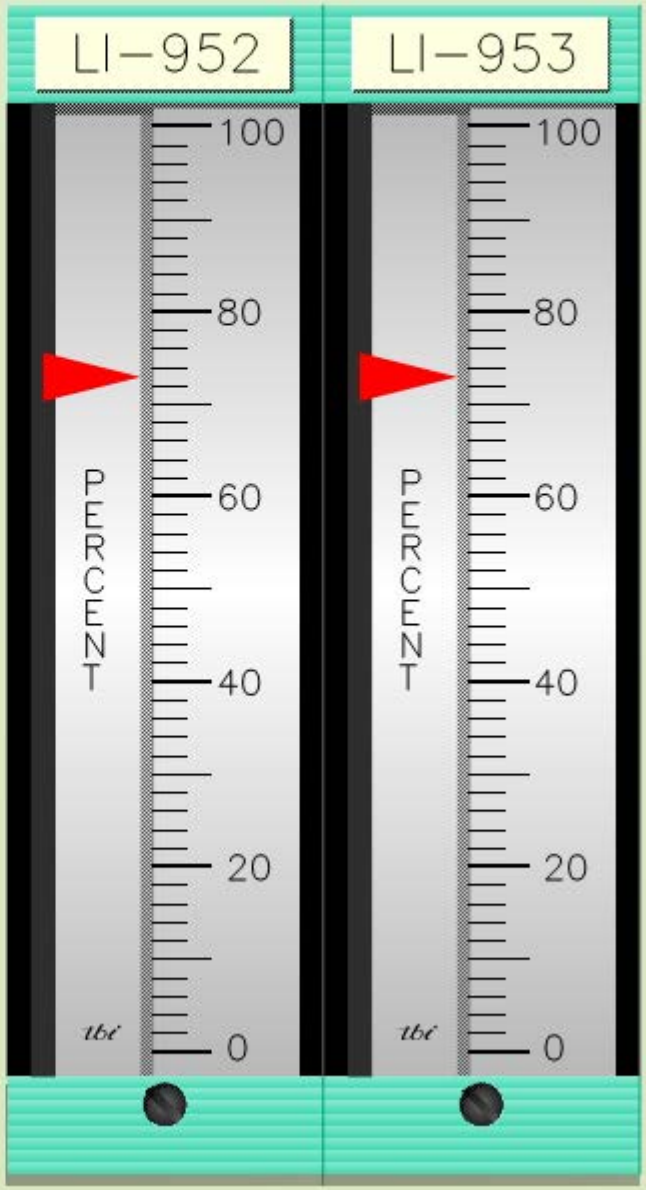
- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.
- If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

LEVEL

1 – 1

1 – 2

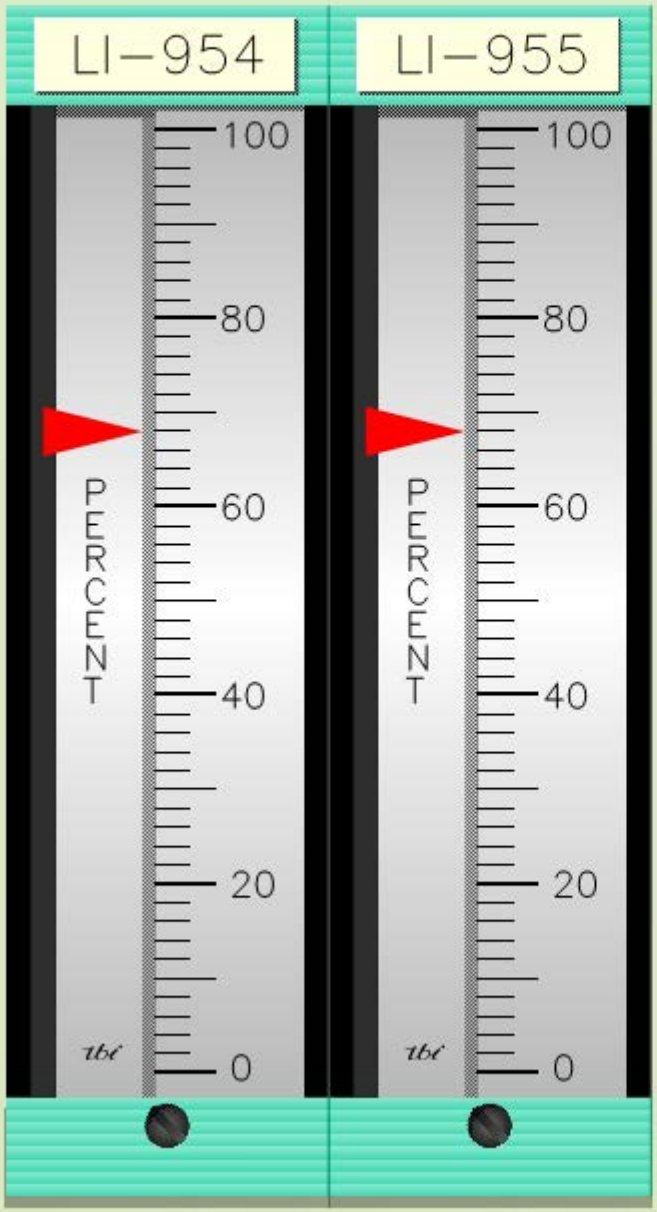

LI–950
LI–951
100
80
60
40
20
0
PERCENT
tbi


LI–952
LI–953
100
80
60
40
20
0
PERCENT
tbi

LEVEL

1–3

1–4


LI–954
100
80
60
40
20
0
PERCENT
tbt

LI–955
100
80
60
40
20
0
PERCENT
tbt

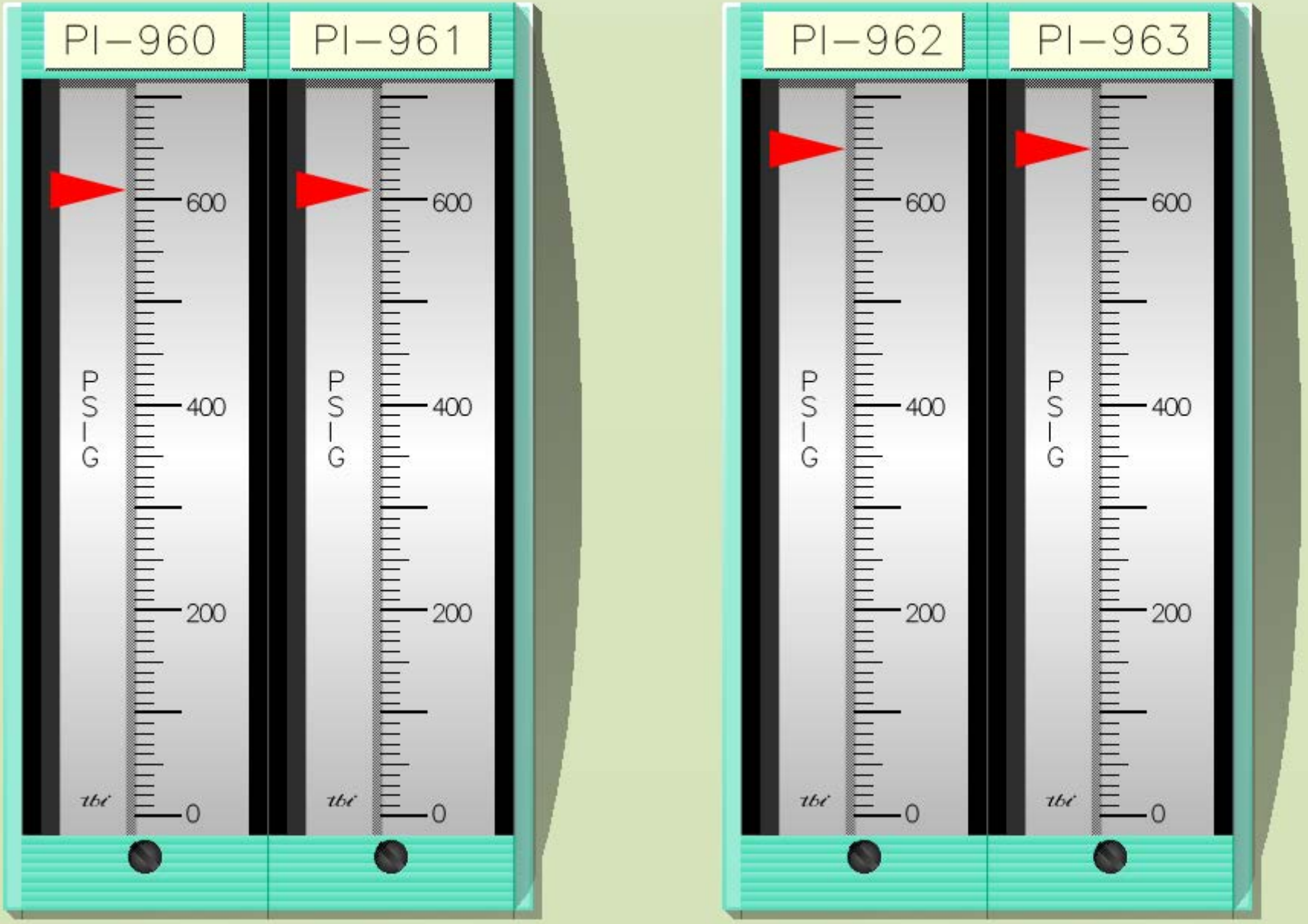

LI–956
100
80
60
40
20
0
PERCENT
tbt


LI–957
100
80
60
40
20
0
PERCENT
tbt

PRESS

1 – 1

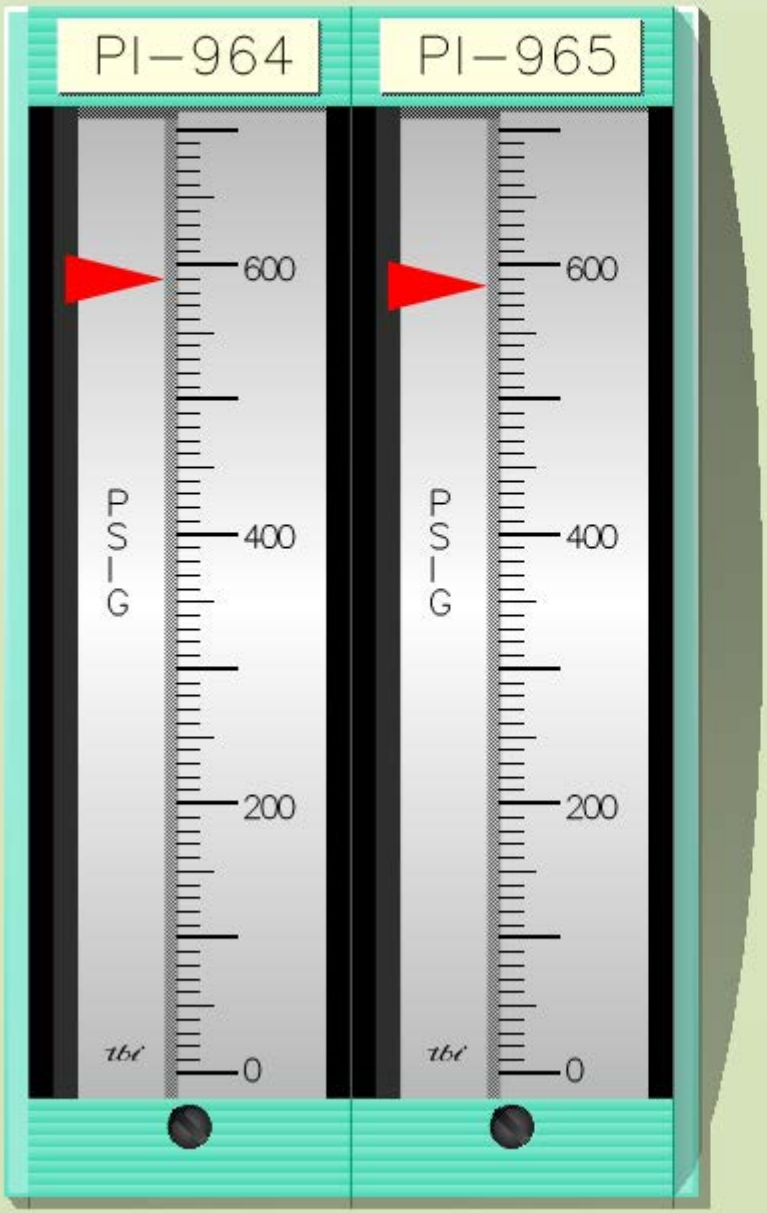
1 – 2

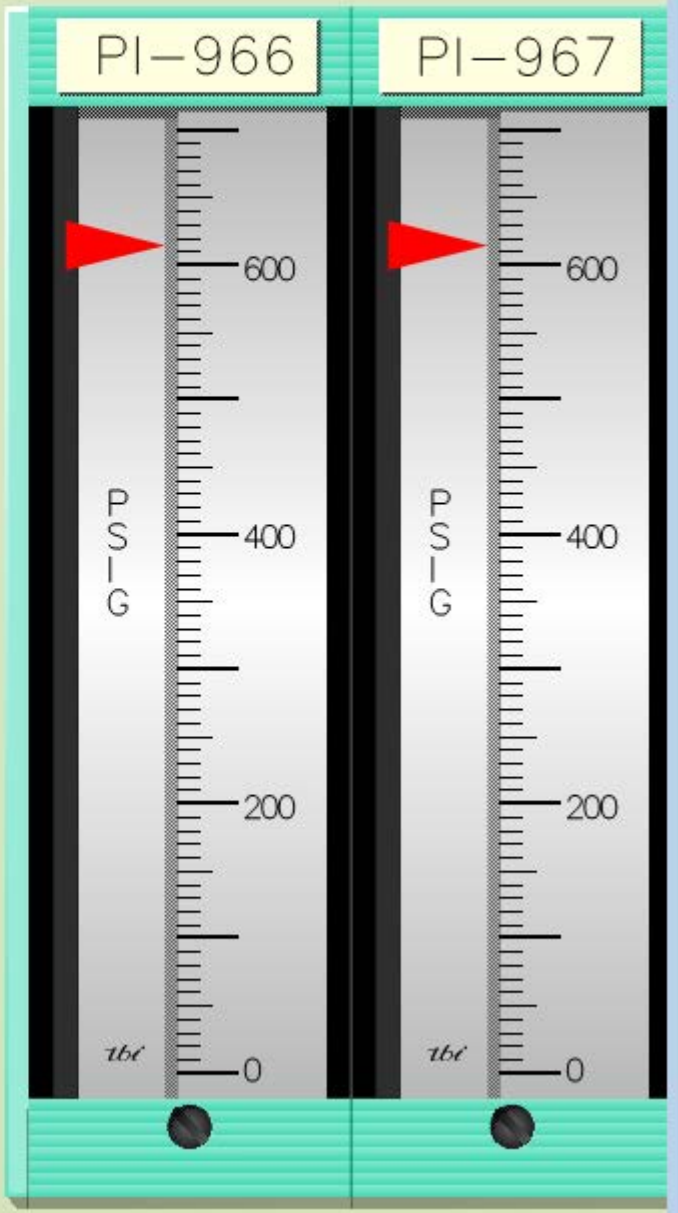


URE

1–3

1–4


PI–964
PI–965
600
400
200
0
PSIG
tbt


PI–966
PI–967
600
400
200
0
PSIG
tbt

12.5 RCS Accumulator Volume

Applicability	Requirement	Parameter
MODE 1	SR 3.5.1.2 SR 3.5.1.4	RCS Accumulator Volume

12.5.1 In table below, record the following:

a. Select indicators used. _____

b. Record levels for indicators selected. _____

c. Record C-2 level from latest STP C-2 volume. _____

RCS Accum.	VB-1 Ind or PPC Point	Current Level (%)	STP C-2 Level	% Level Change
1-1	LI-950 [ ] LI950R [ ]		-	=
	LI-951 [ ] LI951R [ ]		-	=
1-2	LI-952 [ ] LI952R [ ]		-	=
	LI-953 [ ] LI953R [ ]		-	=
1-3	LI-954 [ ] LI954R [ ]		-	=
	LI-955 [ ] LI955R [ ]		-	=
1-4	LI-956 [ ] LI956R [ ]		-	=
	LI-957 [ ] LI957R [ ]		-	=

d. Calculate level changes in table above. _____

12.5.2 Check all current RCS accumulator levels are ≥ 59% [52%] AND ≤ 75% [82%]. _____

12.5.3 Check all RCS accumulator level changes are ≤ +3% [+5.6%]. _____

12.5.4 IF draining or filling of accumulator(s) has occurred
OR level increase is unacceptable,
THEN request chemistry to perform STP C-2 within 6 hours for affected accumulator(s). [ ]N/A _____

12.6 RCS Accumulator Nitrogen Pressure

Applicability	Requirement	Parameter
MODE 1	SR 3.5.1.3	RCS Accumulator Nitrogen Pressure

12.6.1 In table below, record the following:

a. Select indicators used. _____

b. Record pressure readings for indicators selected. _____

RCS Accumulator	VB-1 Ind or PPC Point	Pressure (psig)
1-1	PI-960 [ ] PI960R [ ]	
	PI-961 [ ] PI961R [ ]	
1-2	PI-962 [ ] PI962R [ ]	
	PI-963 [ ] PI963R [ ]	
1-3	PI-964 [ ] PI964R [ ]	
	PI-965 [ ] PI965R [ ]	
1-4	PI-966 [ ] PI966R [ ]	
	PI-967 [ ] PI967R [ ]	

12.6.2 Check RCS accumulator nitrogen pressures are ≥ 600 psig [579 psig] AND ≤ 640 psig [664 psig]. _____

12.7 Pressurizer Level Channels

Applicability	Requirement	Parameter
MODE 1	Admin	PPC Pressurizer Level Channels

12.7.1 Check the following PPC Pressurizer Level Channels have a quality code of good (green): _____

- L0480A
- L0481A
- L0482A

12.7.2 IF a quality code is NOT good, THEN document in a notification. [ ]N/A _____

DIABLO CANYON POWER PLANT
STP C-2
ATTACHMENT 9.1

1 AND 2

TITLE: Accumulator Chemical Concentration Data Sheet

A. Unit: ___1___ Operating MODE: ___1___ Date/Time: _02/23/20_/_0230_

B. Reason for Analysis:

[X] Monthly (31 Day) Analysis [ ] Other _____
[ ] ≥ 3% level increase or any operational draining or filling. (REFER TO OM12.DC1, "Relieving the Watch," Form 69-09377, for date and time of level change as determined by operations.)

C. Accumulator Boron Concentration

	Boron in Limits?			Accumulator Level (%) Vertical Board	Accumulator Level (%) PPC
Accumulator #1: _2340_ ppm	[X]Yes	[ ]No	[ ]N/A	LI—950 _68_ LI—951 _68___	LI950R __68.2_ LI951R __68.1_
Accumulator #2: _2298_ ppm	[X]Yes	[ ]No	[ ]N/A	LI—952 _68___ LI—953 _68___	LI952R __67.8_ LI953R __67.5_
Accumulator #3: _2318_ ppm	[X]Yes	[ ]No	[ ]N/A	LI—954 _67___ LI—955 _67___	LI954R __67.2_ LI955R __67.0_
Accumulator #4: __2322_ ppm	[X]Yes	[ ]No	[ ]N/A	LI—956 _69___ LI—957 _68___	LI956R __68.4_ LI957R __68.1_

Acceptance Criteria
Accumulator level values have no acceptance criteria in STP C-2.

IF accumulator boron concentration is **≥ 2200 ppm** and **≤ 2500 ppm**,
THEN the accumulator results are acceptable.
OTHERWISE the results are NOT acceptable.

Accumulator boron concentrations are: **[X] Acceptable** **[ ] NOT Acceptable**

IF NOT acceptable,
THEN perform the following:

- Immediately notify SFM and chemistry foreman.
- Create a notification. # _____

The chemistry foreman shall notify the chemistry engineer of any out-of-limit parameter.

Comments:

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-A4

Title: Perform RM-19 Channel Check

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform __X__ Simulate____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: Designed for RO candidates in a classroom setting.

References: Operations Policy B-5, Channel Check Criteria, rev 6

Alternate Path: Yes _____ No ____X____

Time Critical: Yes _____ No ____X____

Time Allotment: 10 minutes

Critical Steps: Per Examinee Response - Key

Job Designation: RO

Rev Comments: New

Gen KA # / Rating: G2.3.5 -Ability to use radiation monitoring systems, such as fixed radiation monitors and alarms, portable survey instruments, personnel monitoring equipment, etc. 2.9

RON FORTIER DATE: **11/08/19**
AUTHOR

CHRIS MEHIGAN DATE: **11/26/19**
OPERATIONS REPRESENTATIVE

Directions: All actions taken by examinee should be clearly documented. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure (as applicable) and told the steps with which to begin.

Required Materials: Operations Policy B-5,

Initial Conditions: GIVEN:

- Both Unit 1 and 2 are at 100% power
- STP I-1B, Attachment 12.1, MODES 1, 2, and 3 Daily Checklist is being performed
- The operator has reached step 15, CHANNEL CHECK the steam generator blowdown liquid monitor, RM-19

Initiating Cue: You are instructed to use Operations Section Policy B-5, Channel Check Criteria to perform the CHANNEL CHECK for steam generator blowdown liquid monitor, RM-19 and document all your results to support your determination.

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.
- If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

Task Standard:

NOTE: Do NOT provide examinee with Task Standard :

Channel Check is UNSAT due to:

- Range selector switch is set to NARROW
- Setpoint toggle switch selected to HASP #2 (MAINT ONLY)

Start Time: _____

Stop Time: _____

Follow up Question Documentation:

** Denotes Critical Step and Sub-Steps

2. WESTINGHOUSE RAD MONITORS (includes RM-3, 11, 12, 18, 19, 22)
   a. POWER light is ON.
   b. Operation Selector switch set to OPERATE.
   c. Range Selector switch set to WIDE.
   d. Normal analog channel levels and response.
   e. Red LOW ALARM lamp is OFF.

   There are additional checks for RM-11, Containment Air Particulate detector:
   f. Sample Selector set to MAIN sample.
   g. PUMP ON light is lit.
   h. FILTER NOT IN MOTION light is OUT.

   There is an additional check for RM-3, OWS effluent monitor:
   i. Flow verified through the monitor while the OWS is running.

NOTE: RM-19 setpoint toggle switch selected to the HASP #1 (S/G TO B/D) position.

3. VICTOREEN RAD MONITORS

   ANALOG RAD MONITORS (includes RM-71, 72, 73, 74, 30, 31, U-1 RM-29)
   a. Switch selector to OPERATE or ALL.
   b. Green SAFE/FAIL/RESET light is ON.
   c. Normal analog channel levels and response.

   DIGITAL RMs (includes RM-14/R, 15/R, 24/R, 28/R, 44A/B, U-2 RM-29)
   a. White NORMAL panel light is ON.
   b. Red SKID PMP light ON.
   c. The Remote Display Units (RDU) on the back panels have digital readouts which must update periodically, generally from 15 to 120 seconds.

NOTES:
1. RM-30, 31 detectors measure in R/hr and should generally be less than 1 R/hr on a normal channel check. An auto check of these detectors to 1E3 will occur every 17 minutes to ensure these monitors are not failed low. This auto check is NOT a required channel check.
2. RM-29 (Unit 2) detector has a RANGE light which will illuminate when the detector reading drops below its under-range of less than 0.01 mR/hr. When it registers activity greater than 0.01mR/hr, the red RANGE light will go OUT.

4. MISCELLANEOUS RADIATION MONITORS

   RM-58, 59
   a. Switch selected to OPERATE.
   b. Green OPERATE light is ON.
   c. Normal analog channel levels and response.

   NOTE 1: RM-59 will generally read very low, whereas RM-58 may read significantly higher especially following a refueling on that unit.

   NOTE 2: RM-59 - if no pulses occur within approximately 150 seconds, the failure alarm comes in, otherwise the OPERATE light stays illuminated.

   RM-23, RADECO monitor (located in PM-205, 115', Aux Bldg)
   a. HIGH and LOW alarm lamps should be ON (these lamps go OUT on an alarm condition).
   b. Normal analog channel levels and response.

   RM-25, 26, 51, 52, 53, 54
   a. White NORMAL light is ON (RM-51 through 54).
   b. Yellow FAILURE light is OFF (RM-25, 26).
   c. Normal analog channel levels and response.

Question: _____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

_____

_____

Examinee Response - Key
RM-19 Channel Check" **SAT: _____** **UNSAT: __X___** **Basis for SAT/UNSAT:** • Range selector switch is set to NARROW • Setpoint toggle switch selected to HASP #2 (MAINT ONLY)

** Denotes Critical Step and Sub-Steps

Initial Conditions: GIVEN:

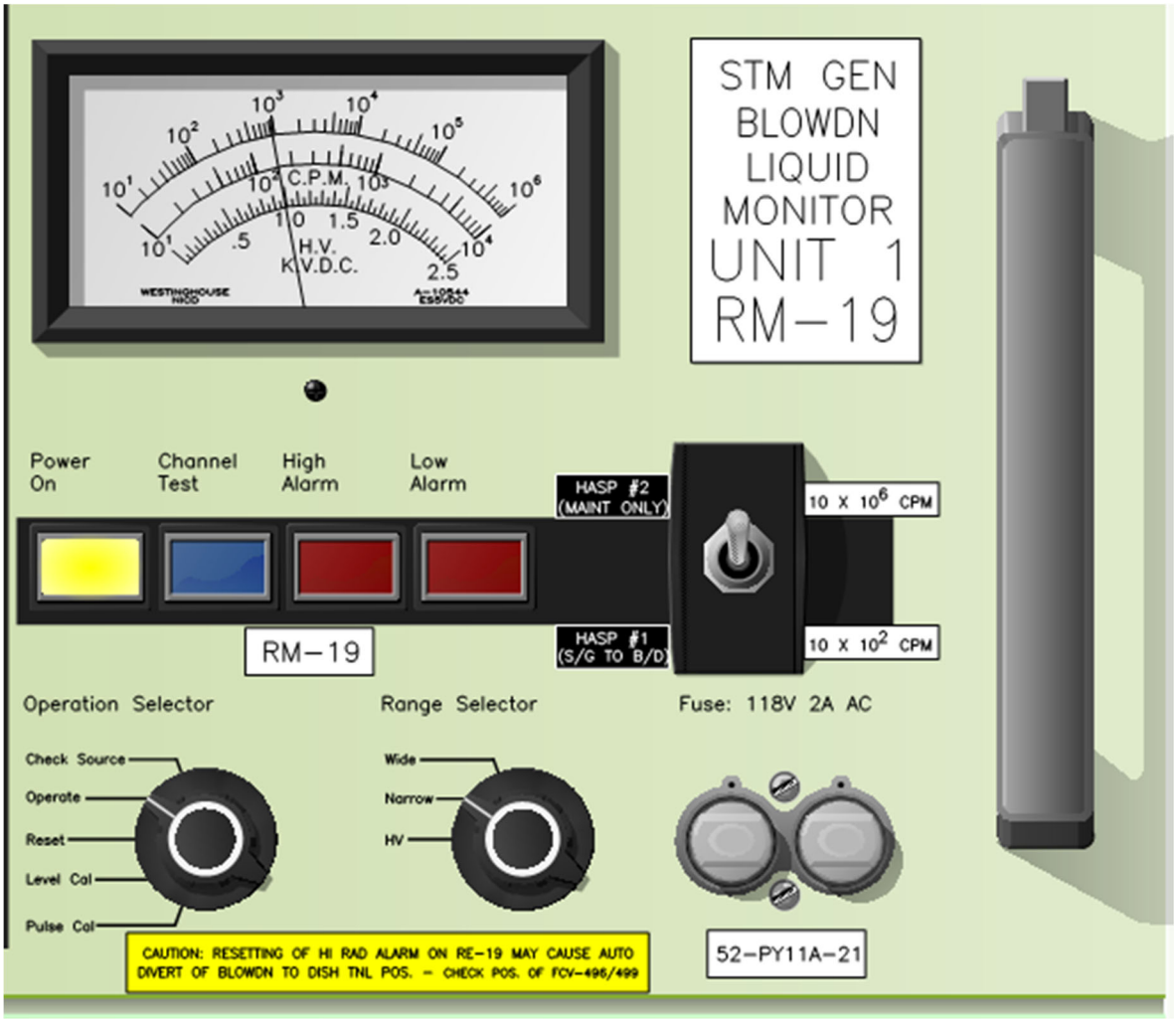
- Both Unit 1 and 2 are at 100% power
- STP I-1B, Attachment 12.1, MODES 1, 2, and 3 Daily Checklist is being performed
- The operator has reached step 15, CHANNEL CHECK the steam generator blowdown liquid monitor, RM-19

Initiating Cue: You are instructed to use Operations Section Policy B-5, Channel Check Criteria to perform the CHANNEL CHECK for steam generator blowdown liquid monitor, RM-19 and document all your results to support your determination.

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.
- If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

Examinee Response - Key
RM-19 Channel Check" **SAT: _____** **UNSAT: _____** **Basis for SAT/UNSAT:**


STM GEN
BLOWDN
LIQUID
MONITOR
UNIT 1
RM-19
C.P.M.
H.V.
K.V.D.C.
Power On
Channel Test
High Alarm
Low Alarm
HASP #2 (MAINT ONLY)
HASP #1 (S/G TO B/D)
10 X 10^6 CPM
10 X 10^2 CPM
RM-19
Operation Selector
Range Selector
Fuse: 118V 2A AC
Check Source
Operate
Reset
Level Cal
Pulse Cal
Wide
Narrow
HV
CAUTION: RESETTING OF HI RAD ALARM ON RE-19 MAY CAUSE AUTO DIVERT OF BLOWDN TO DISH TNL POS. - CHECK POS. OF FCV-496/499
52-PY11A-21

DIABLO CANYON POWER PLANT UNITS 1 AND 2

TITLE: **CHANNEL CHECK CRITERIA**

APPROVED: _____
Operations Manager

As defined in the Technical Specifications (Tech Specs), "a CHANNEL CHECK shall be the qualitative assessment, by observation, of channel behavior during operation. This determination shall include, where possible, comparison of the channel indication and status to other indications or status derived from independent instrument channels measuring the same parameter."

The first sentence of the CHANNEL CHECK definition implies that single instrument channel checks are entirely permissible. The second part of the definition goes on to say where possible, a CHANNEL CHECK of independent, redundant channels measuring the same parameter shall be performed. It is also clear from the definition, that quantitative limits are not applicable to CHANNEL CHECKS.

In the past, several different classes of instruments have presented problems to operators in their CHANNEL CHECKS. These include flow instruments, which utilize square root extractors, radiation monitors, and process analysis instruments (ANI/ANRs). This policy was written to standardize the procedure for performing CHANNEL CHECKS. It is very important that the channel check criteria listed below be used as GUIDELINES for determining channel operability. Remember that not all checks need to be satisfied when determining that a particular instrument is OPERABLE. For example, a channel check criterion for the Radiation Monitors is to check the "POWER light is ON." If the POWER light is found OFF, the monitor may still be OPERABLE. Operators need to look at other indications as well. If the RM were indicating normal background radiation, the analog meter needle was oscillating slightly, all switches were in their normal position, and power fuses were installed, the shift operators should consider the Radiation Monitor OPERABLE. In this case, it is probable the POWER ON light bulb is burned out. The "guideline" status of these CHANNEL CHECK steps must always be recognized.

A. GENERAL CHANNEL CHECK CRITERIA

The criteria listed below are applicable to most channel checks and may be applied to single and/or redundant instrument channels. Whenever an instrument channel is declared inoperable, the SFM needs to consider the effect on protection bistables associated with that indication. Certain criterion listed below will apply to instrument classes listed in the following sections of this policy.

1. Most instrument loops at DCPP utilize a 4-20 mA current scheme. Thus, most zero (0) readings occur at 4 mA. This is termed a "live zero", since the instrument should generate a current output even for the zero reading ("0"). However with various accuracy limits among instruments, it is very possible to have a below zero reading which is normal for that channel. However, if the meter needle is hard against its low limit peg and motionless, the channel may have failed low and should be considered inoperable. Contact I&C for evaluation of the instrument and the SFM for status of channel operability.

2. For redundant instruments measuring the same parameter, one indicator reading GREATER THAN 5% (of scale) higher or lower than other channels should be declared inoperable. An exception to this rule is with the Pressurizer Level Channels, where one indicator reading GREATER THAN 8.5% (of scale) higher or lower than other channels should be declared inoperable. (Reference A0437900/07).

3. Some parameters are measured by both WIDE RANGE and NARROW RANGE instruments, e.g., accumulator levels. Because the instrument loops are calibrated to different ranges, these channels should NOT be considered redundant channels for the purpose of CHANNEL CHECKS.

4. Most analog meters indicate they are updating properly by showing a slight meter needle movement (oscillation). Most digital meters will "refresh" their indications periodically, e.g., every 20 seconds. If an analog meter needle is "rock steady" or oscillating excessively or if a digital indication is not updating periodically, then notify the SFM since the instrument may be inoperable. I&C should be contacted for evaluation of the channel response.

5. Many chart recorders provide the plant with permanent logs. In this case, I&C will calibrate the recorder pen trace more accurately than the meter scale pointer. Most meters and recorders exhibit a small amount of needle or pen oscillation. If this oscillation is excessive, e.g., ±5% of channel scale, the instrument should be considered inoperable. Contact I&C for evaluation of meters or recorders exhibiting this behavior.

6. When comparing NI-31 or 32 with a Gamma-Metrics channel, the channel check is acceptable if the readings are within one decade of each other. (Reference A0603406/03)

7. Section E lists appropriate reference procedures for all instrument checks described within this Policy. Exercise caution when using quantitative test documents for performing CHANNEL CHECKS.

B. RADIATION MONITOR CHECKS

Due to the wide variety of radiation monitors currently in use at DCPP, not all the checks listed below can be performed for each class of monitor. Operators should use ONLY those checks which are applicable for the RM they are channel checking. If the validity of an indication on a RMS channel is questioned, the SFM and I&C shall be notified for an evaluation of the problem and a determination of channel operability.

1. Many of the RMS channels below have an analog meter indication. A normal channel check of these meters should indicate background or normal, historical radiation levels. Analog meters are updating properly when they show a slight meter needle movement (oscillation).

2. WESTINGHOUSE RAD MONITORS (includes RM-3, 11, 12, 18, 19, 22)
   a. POWER light is ON.
   b. Operation Selector switch set to OPERATE.
   c. Range Selector switch set to WIDE.
   d. Normal analog channel levels and response.
   e. Red LOW ALARM lamp is OFF.

   There are additional checks for RM-11, Containment Air Particulate detector:
   f. Sample Selector set to MAIN sample.
   g. PUMP ON light is lit.
   h. FILTER NOT IN MOTION light is OUT.

   There is an additional check for RM-3, OWS effluent monitor:
   i. Flow verified through the monitor while the OWS is running.

NOTE: RM-19 setpoint toggle switch selected to the HASP #1 (S/G TO B/D) position.

3. VICTOREEN RAD MONITORS

   ANALOG RAD MONITORS (includes RM-71, 72, 73, 74, 30, 31, U-1 RM-29)
   a. Switch selector to OPERATE or ALL.
   b. Green SAFE/FAIL/RESET light is ON.
   c. Normal analog channel levels and response.

   DIGITAL RMs (includes RM-14/R, 15/R, 24/R, 28/R, 44A/B, U-2 RM-29)
   a. White NORMAL panel light is ON.
   b. Red SKID PMP light ON.
   c. The Remote Display Units (RDU) on the back panels have digital readouts which must update periodically, generally from 15 to 120 seconds.

NOTES:
1. RM-30, 31 detectors measure in R/hr and should generally be less than 1 R/hr on a normal channel check. An auto check of these detectors to 1E3 will occur every 17 minutes to ensure these monitors are not failed low. This auto check is NOT a required channel check.
2. RM-29 (Unit 2) detector has a RANGE light which will illuminate when the detector reading drops below its under-range of less than 0.01 mR/hr. When it registers activity greater than 0.01mR/hr, the red RANGE light will go OUT.

4. MISCELLANEOUS RADIATION MONITORS

   RM-58, 59
   a. Switch selected to OPERATE.
   b. Green OPERATE light is ON.
   c. Normal analog channel levels and response.

   NOTE 1: RM-59 will generally read very low, whereas RM-58 may read significantly higher especially following a refueling on that unit.

   NOTE 2: RM-59 - if no pulses occur within approximately 150 seconds, the failure alarm comes in, otherwise the OPERATE light stays illuminated.

   RM-23, RADECO monitor (located in PM-205, 115', Aux Bldg)
   a. HIGH and LOW alarm lamps should be ON (these lamps go OUT on an alarm condition).
   b. Normal analog channel levels and response.

   RM-25, 26, 51, 52, 53, 54
   a. White NORMAL light is ON (RM-51 through 54).
   b. Yellow FAILURE light is OFF (RM-25, 26).
   c. Normal analog channel levels and response.

C. FLOW INSTRUMENT (SQUARE ROOT EXTRACTOR) CHECKS

When the plant is operated in a low power condition or following maintenance outages, the accuracy of square root extractor indications is frequently questioned by Operations personnel. In some cases the instrument may be inoperable or it may simply need to be backfilled. It is also possible that low flow conditions will place the square root extractor outside its calibrated range. Any time the validity of an indication is in question, I&C should be notified for an evaluation of the channel.

1. All flow instruments utilizing square root extractors are inherently inaccurate when reading less than 10% of channel scale. No accuracy requirements apply in this range and no operator action is necessary. For example, the AFW flow channels on VB3 are 0-300 gpm scales. No accuracy limits are applicable when reading less than 30 gpm.

2. The following table should aid Operations personnel in performing channel checks on these flow instruments which have no redundant indications:

INSTRUMENT	CHANNEL	CHANNEL CHECK CRITERIA
AFW Flow	FI-157,158, 159,160	>30 gpm, ± 5 gpm. (Refer. General Channel Check A 1.)
Plant Vent Flow	FR-12	Reasonable comparison with fan configuration of Aux/Fuel Handling Bldg vent modes, e.g., Bldgs Only - Approx. 13E4 cfm.
Radwaste Discharge Flow	FR-20	Verify flow is recording during a release period. If possible, channel check with FR-20A (RWS filter 0-3 discharge).
S/G Blowdown Flow	FR-53	Verify flow is recording during a release period. PM-205, multipoint recorder point # 6 in service with a corresponding digital readout (double or 2X digital readout).

NOTE: The Test switch located in 100', GW area of the Aux Bldg should not be used by Operation's personnel. That switch is reserved for maintenance activities performed by I&C personnel.

OWS Influent Flow	FR-251 (7 digit totalizer nonresettable)	If an automatic discharge is not observed, start the turbine building waste pumps manually. Once overboard discharge commences, verify totalizer ≤100gal/min (which corresponds to 66.7% on FI-251) when the OWS is in service and discharging.

D. PROCESS ANALYSIS INSTRUMENT CHECKS

The following table should aid Operators in performing channel checks on various process analysis instruments.

INSTRUMENT	CHANNEL	CHANNEL CHECK CRITERIA
Waste Gas O2 Analyzers	ANI/ANR 75,76	Verify FI-905,906 have approx. 1 scfh, otherwise run WGC for several minutes. Max. difference between channels is ± 0.20% O2.
DFO transfer piping leak detection	ANI-501	Display cycles through cables 1-6 and all cables indicate "OK." If remapping is required, refer to OP J-6C:VI.

E. PROCEDURAL REFERENCES

Due to the qualitative nature of a CHANNEL CHECK assessment, the procedures listed below should only be used in a reference capacity. Quantitative limits are not applicable to CHANNEL CHECKS. Moreover, the guideline nature of this Operations Policy should be recognized and applied appropriately. Remember if these references are consulted; use the correct Unit and most recent revision of the procedure.

RADIATION MONITOR CHECKS

1. STP I-18P1, Functional Test of Oily Water Separator Influent Monitor, RM-3
2. STP I-100A, Containment Air Particulate/Gas Radiation Monitor RM-11/RM-12 Functional Test
3. STP I-102A, Functional Test of Liquid Radwaste Discharge Monitor, RM-18
4. STP I-111A, Functional Test of Steam Generator Blowdown Sample Effluent Liquid Monitor, RM-19
5. STP I-103A, Functional Test of Gas Decay Tank Gas Discharge Monitor, RM-22
6. STP I-39-R71.A, Functional Test of Main Steam Line Radiation Monitor, RM-71, 72, 73, 74
7. STP I-18N1, Functional Test of Containment High Range Radiation Monitors, RM-30, RM-31
8. STP I-39-R29.A, High Range Plant Vent Gross Gamma Monitor RM-29 Functional Test
9. STP I-39-R14.A, Plant Vent Noble Gas Radiation Monitor RM-14 Functional Test
10. STP I-39-R14R.A, Plant Vent Noble Gas Radiation Monitor RM-14R Functional Test
11. STP I-39-R24.A, Plant Vent Iodine Radiation Monitor RM-24 Functional Test
12. STP I-39-R24R.A, Plant Vent Iodine Radiation Monitor RM-24R.A Functional Test
13. STP I-39-R28.A, Plant Vent Particulate Radiation Monitor RM-28 Functional Test
14. STP I-39-R28R.A, Plant Vent Particulate Radiation Monitor RM-28R Functional Test
15. STP I-39-R44A.A, Containment Ventilation Exhaust Radiation Monitor RM-44A Functional Test
16. STP I-39-R44B.A, Containment Ventilation Exhaust Radiation Monitor RM-44B Functional Test
17. STP I-119A, Functional Test: Fuel Handling Building Area Radiation Monitors, RM-58 / RM-59
18. STP I-18F1, Functional Test of S/G Blowdown Tank Radiation Monitor RM-23
19. STP I-18M1, Control Room Air Intake Monitor Functional Test (RM-25 & RM-26)
20. STP I-118A, Functional Test of Control Room Pressurization Radiation Monitors, RM-51, 52, 53, 54

FLOW INSTRUMENTS

1. STP I-3-F50, Auxiliary Feedwater to Steam Generator 1-1 (2-1) Flow Channel FT-50 Calibration
2. STP I-3-F77, Auxiliary Feedwater to Steam Generator 1-2 (2-2) Flow Channel FT-77 Calibration
3. STP I-3-F78, Auxiliary Feedwater to Steam Generator 1-3 (2-3) Flow Channel FT-78 Calibration
4. STP I-3-F79, Auxiliary Feedwater to Steam Generator 1-4 (2-4) Flow Channel FT-79 Calibration
5. STP I-39-F12.B, Plant Vent Flow Measurements System Calibration
6. STP I-19-F243.A, Liquid Radwaste Effluent Line Flow Channel FIT-243 Functional Test
7. STP I-4-F53.A, Steam Generator Blowdown Effluent Line Flow Channel FT-53 Functional Test
8. STP I-27-F251.A, Oily Water Separator System Flow Channel FT-251 Functional

PROCESS ANALYSIS INSTRUMENTS

1. STP I-24-A75.A, Functional Test of Waste Gas System Oxygen Analyzer Channels 75 and 76
2. STP M-121, Diesel Fuel Oil Leak Detection System ANI-501 Functional Test

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number:	NRCL181-A5
Title:	Apply Overtime Limit Restrictions
Examinee:	_____
Evaluator:	_____ _____ _____ Print Signature Date
Testing Method:	Perform ____X____ Simulate _____
Results:	Sat _____ Unsat _____ Total Time: _____ minutes
Comments:	

References:	OM14.ID1, Fatigue Management Rule Program, rev 30	
Alternate Path:	Yes _____ No ____X____	
Time Critical:	Yes _____ No ____X____	
Time Allotment:	15 minutes	
Critical Steps:	See Examinee Response - Key	
Job Designation:	SRO	
Rev Comments:	Revised from L061 (NRCADM061-COO-SRO1)	
Gen KA # / Rating:	G2.1.5 – Ability to use procedures related to shift staffing, such as minimum crew complement, overtime limitations, etc.	3.9

AUTHOR: **LISA TORIBIO** DATE: **11/20/19**

OPERATIONS REPRESENTATIVE: **CHRIS MEHIGAN** DATE: **11/26/19**

Directions: All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the step at which to begin.

Required Materials: OM14.ID1, Fatigue Management Rule Program, rev 30

Initial Conditions: GIVEN:

- It is 0600 on Monday, 2/17
- Both Units are operating at 100% power
- The oncoming Control Operator has just called in sick
- WorkForce scheduling program is out of service
- The following licensed Operators are currently available:

Operator #1			
Day	**Start Time**	**End Time**	**Position**
Sunday, 2/9	0700	1900	Control Operator
Monday, 2/10	0700	1900	Control Operator
Tuesday, 2/11	0700	1900	Control Operator
Wednesday, 2/12	0900	2200	WC Extra
Thursday 2/13	Day Off		
Friday 2/14	0700	2000	Balance of Plant Operator
Saturday, 2/15	1400	1500	TeleCon personnel statement
Sunday 2/16	0700	1900	Control Operator
Monday 2/17 (proposed)	0700	1900	Control Operator

Initial Conditions (continued):

Operator #2			
Day	**Start Time**	**End Time**	**Position**
Sunday, 2/9	1900	0700	Work Control Lead
Monday, 2/10	1900	0700	Work Control Lead
Tuesday, 2/11	Day Off		
Wednesday, 2/12	1900	0700	Control Operator
Thursday, 2/13	1900	0700	Work Control Lead
Friday, 2/14	1900	0700	Work Control Lead
Saturday, 2/15	1900	0700	Control Operator
Sunday 2/16	Day Off		
Monday 2/17 (proposed)	0700	1900	Control Operator

Operator #3			
Day	**Start Time**	**End Time**	**Position**
Sunday, 2/9	1000	1700	Fire Watch
Monday, 2/10	Day Off		
Tuesday, 2/11	0700	2100	Control Operator
Wednesday, 2/12	0700	1900	Balance of Plant Operator
Thursday, 2/13	0700	1900	Balance of Plant Operator
Friday, 2/14	0700	2000	Balance of Plant Operator
Saturday, 2/15	1000	2000	Balance of Plant Operator
Sunday 2/16	Day Off		
Monday 2/17 (proposed)	0700	1900	Control Operator

Initiating Cue: Review the hours worked by the available Operators and determine their ability to fill the watch bill. Document reason(s) each operator is available or unavailable.

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

NOTE: Do NOT provide examinee with Task Standard

Task Standard: **See Examinee Response Key.**

Start Time: _____ **End Time:** _____

Examinee Response - Key

Only Operator #2 can accept the watch without a waiver based on the allowable work hours during Non-Outage Conditions. NOTE: Only reason for unavailability is critical, hours not required with answer.
• **Operator #1 – Not Available**
  ○ Can not exceed 16 hours in any continuous 24 period: **Satisfactory (max was 13 hours)**
  ○ Can not exceed 26 hours in any continuous 48 period: **Satisfactory (max was 25 hours)**
  ○ Can not exceed 72 hours in any continuous 168 period: **Satisfactory (max was 63 hours)**
  ○ **34 hour continuous break required in any 9 day period: Unsatisfactory (taking the relief watch at 0700 on Monday would result in a continuous break of 33 hours in the past 9 day period)**
  ○ 10 hour continuous break minimum break required between shifts: **Satisfactory (min was 12 hours)**
• **Operator #2 – Available**
  ○ Can not exceed 16 hours in any continuous 24 period: **Satisfactory (max was 12 hours)**
  ○ Can not exceed 26 hours in any continuous 48 period: **Satisfactory (max was 24 hours)**
  ○ Can not exceed 72 hours in any continuous 168 period: **Satisfactory (max was 72 hours)**
  ○ 34 hour continuous break required in any 9 day period: **Satisfactory (min was 36 hours)**
  ○ 10 hour continuous break minimum break required between shifts: **Satisfactory (min was 12 hours)**
• **Operator #3 – Not Available**
  ○ Can not exceed 16 hours in any continuous 24 period: **Satisfactory (max was 14 hours)**
  ○ Can not exceed 26 hours in any continuous 48 period: **Satisfactory (max was 24 hours)**
  ○ **Can not exceed 72 hours in any continuous 168 period: Unsatisfactory (max was 73.0 hours)**
  ○ 34 hour continuous break required in any 9 day period: **Satisfactory(max was 38 hours)**
  ○ 10 hour continuous break minimum break required between shifts: **Satisfactory (min was 10 hours)**

Follow up Question Documentation:

Question: _____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

_____

_____

Initial Conditions: GIVEN:

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Friday 2/14	0700	2000	Balance of Plant Operator
Saturday, 2/15	1400	1500	TeleCon personnel statement
Sunday 2/16	0700	1900	Control Operator
Monday 2/17 (proposed)	0700	1900	Control Operator

Operator #2			
Day	**Start Time**	**End Time**	**Position**
Sunday, 2/9	1900	0700	Work Control Lead
Monday, 2/10	1900	0700	Work Control Lead
Tuesday, 2/11	Day Off		
Wednesday, 2/12	1900	0700	Control Operator
Thursday, 2/13	1900	0700	Work Control Lead
Friday, 2/14	1900	0700	Work Control Lead
Saturday, 2/15	1900	0700	Control Operator
Sunday 2/16	Day Off		
Monday 2/17 (proposed)	0700	1900	Control Operator

Initial Conditions (continued):

Operator #3			
Day	**Start Time**	**End Time**	**Position**
Sunday, 2/9	1000	1700	Fire Watch
Monday, 2/10	Day Off		
Tuesday, 2/11	0700	2100	Control Operator
Wednesday, 2/12	0700	1900	Balance of Plant Operator
Thursday, 2/13	0700	1900	Balance of Plant Operator
Friday, 2/14	0700	2000	Balance of Plant Operator
Saturday, 2/15	1000	2000	Balance of Plant Operator
Sunday 2/16	Day Off		
Monday 2/17 (proposed)	0700	1900	Control Operator

Initiating Cue: Review the hours worked by the available Operators and determine their ability to fill the watch bill. Document reason(s) each operator is available or unavailable.

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

Evaluation Results and Basis	
Operator #1 **___ Available** **___ Unavailable**	**Basis:**
Operator #2 **___ Available** **___ Unavailable**	**Basis:**
Operator #3 **___ Available** **___ Unavailable**	**Basis:**

Fatigue Management Rule Program

05/09/19
Effective Date

QUALITY RELATED

Table of Contents

1. SCOPE

1.1 This procedure applies to all PG&E employees, contractors, vendors, TAs, and on-loan personnel who:

1.1.1 Hold unescorted access or unescorted access authorization to the station's protected areas.

1.1.2 Perform radiation protection or chemistry duties required as a member of the onsite emergency response organization minimum shift complement.

1.2 This procedure implements requirements for fatigue management and related work hour controls per 10 CFR 26, Subpart I, "Managing Fatigue."

1.3 This procedure establishes the following:

1.3.1 Requirements prescribed by 10 CFR 26, Subpart I.

1.3.2 Process for implementing work hour limits for workers performing work subject to 10 CFR 26, subsection 26.205, "Work Hours."

1.3.3 Process used to schedule, track, and calculate work hours.

1.3.4 Conditions and process applicable to covered work hour limit waivers.

1.3.5 Conditions and process applicable to non-covered work hour limit authorizations.

1.3.6 Conditions and process applicable to performing "Fatigue Assessments."

2. DISCUSSION

2.1 DCPP began using the maximum average work hours (AVG 54) method effective Monday, July 29, 2013.

2.2 The requirements of this procedure are intended to provide reasonable assurance that worker fatigue is avoided and all workers will be able to safely perform their duties and maintain the health and safety of the public.

3. DEFINITIONS

3.1 Behavior Observation Program (BOP) Supervisor: Individual trained/qualified as a fitness for duty supervisor (FFDSUP) responsible for ensuring individuals have the correct fatigue management rule (FMR) classification in the site computer system and are responsible to implement BOP for assigned personnel.

3.2 Break: The number of hours between the time an individual leaves work and starts their next work period; excludes turnover on one end of the work period.

3.3 Circadian Factors: Human physiological processes, such as body temperature and hormone releases, that may affect alertness and cognitive or motor functioning.

3.4 Covered Work: Work that includes:

3.4.1 Operating or on-site directing of the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety.

3.4.2 Performing on-site maintenance or on-site directing of the maintenance on Systems, Structures, and Components (SSCs) that a risk-informed evaluation process has shown to be significant to public health and safety.

3.4.3 Performing radiation protection or chemistry duties required as a member of the on-site emergency response organization minimum shift complement.

3.4.4 Performing operations responder duties that includes oversight of the effect of fires and fire suppression on safe shutdown systems.

3.4.5 Performing security duties including but not limited to an armed responder, Zebra, Nora, Alarm Station Officer, Watch Commander, Response Team Leader, or Nuclear Security Sergeant.

3.5 Covered Worker: An individual who is:

3.5.1 Subject to work hour controls under the FMR.

3.5.2 Granted unescorted access to the station's protected area and performs covered work.

3.6 Day Off: A day when a work period does not begin.

3.7 Directing: The exercise of control over a work activity by a worker who is directly involved in the execution of the work activity, and either:

3.7.1 Makes technical decisions for that activity without subsequent technical review.

3.7.2 Is ultimately responsible for the correct performance of that work activity.

3.8 Electronic Tracking System: A software application used to schedule, develop, and track work hours and evaluation periods.

3.9 Evaluation Period: A rolling six week period that includes the current week and the five previous weeks.

3.10 Fatigue: The degradation of an individual's cognitive and motor functions as a result of inadequate rest.

3.11 Fatigue Assessment: An assessment performed by the Shift Manager, security watch commander, or a qualified BOP supervisor for the following reasons:

3.11.1 For Cause

3.11.2 Post Event if required per OM14.ID5, "Fitness For Duty Program For-Cause and Post Event Chemical Testing"

3.11.3 Self-Declaration

3.11.4 Follow-Up

3.12 Fatigue Management Rule (FMR) Representative: Individual selected by director, manager, or supervisor to become knowledgeable in FMR program to assist with FMR implementation in the department, section or work group. FMR representatives from operations, maintenance, site services contractor, radiation protection, chemistry, and security assist with FMR implementation.

3.13 Incidental Duties: Unscheduled work activities performed off-site, including telephone calls and work required by the supervisor to complete off-site, that are required by the station but do not exceed a nominal 30 minutes in a single break period.

3.14 Nominal: Quantity of time spent on work activities to not exceed 30 minutes plus 25% (37.5 minutes total) in a single break period.

3.15 Non-Incidental Duties: Work activities performed off-site that are required by the station and exceed a nominal 30 minutes in a single break period.

3.16 Operations Responder: A designated operations person on shift who provides fire brigade oversight for the effect of fires and fire suppression on safe shutdown equipment.

3.17 Outage: The time when the output breakers are open and the unit is not connected to the grid.

3.18 Overtime Limits: Controls that limit the number of overtime hours and/or consecutive days personnel may work.

3.19 Restorative Sleep: A brief opportunity with accommodations for restorative, uninterrupted sleep of at least one half hour in a designated area.

3.20 Risk Informed SSCs: Those systems that fall under the Maintenance Rule and designated as "risk significant" (refer to Attachment 1). At DCPP, work on all Maintenance Rule SSCs is treated as covered work to prevent minor errors and to take a conservative approach.

3.21 Site Senior-Level Manager: An individual in the position of vice president nuclear generation, Station Director, senior director, or director.

3.22 Turnover Time: Time at the beginning or end of a work period that allows personnel to become familiar with their job duties and responsibilities or to transfer pertinent information to personnel assuming their job duties or responsibilities.[T35087]

3.23 Waiver Assessment: An assessment authorized by the security watch commander or Shift Manager, with concurrence from a site senior-level manager, because the need exists to waiver FMR requirements to protect the health and safety of the public or plant security. This assessment is performed by a qualified BOP supervisor knowledgeable of the work to be performed.

3.24 Work Day: A work day is those consecutive hours from the start of a shift. All hours continuously worked after midnight on a shift that started before midnight count for the previous day.

3.25 Work Hours: The amount of time an individual performs duties for the station. This includes all work hours, with the following exceptions:

3.25.1 Shift turnover time.

3.25.2 Within-shift breaks and rest periods in which there is reasonable opportunity and accommodations for restorative sleep, such as a nap, greater than 30 minutes.

3.25.3 Unscheduled work hours for the purpose of participating in unannounced emergency preparedness exercises and drills are excluded.

3.25.4 Periods defined in writing by the NRC.

3.26 Work Period: All work hours where restorative sleep does not occur.

3.27 Work Week: A work week is defined as follows:

3.27.1 Operations use a seven day work week that starts at 0001hrs on Monday morning and continues through 2400hrs on Sunday night.

3.27.2 All other departments use a seven day work week that starts at 0001hrs on Sunday morning and continues through 2400hrs on Saturday night.

4. RESPONSIBILITIES

4.1 Site senior-level managers are responsible for:

4.1.1 Authorizing work as meeting the requirements to protect the health and safety of the public.

4.1.2 Ensuring at least once per calendar year a review is performed to monitor hours worked for compliance with the FMR.

4.1.3 Concurring with waivers authorized by the Shift Manager and security watch commander.

4.2 Shift Managers and watch commanders (for security issues), are responsible for:

4.2.1 Determining work is required to protect the health and safety of the public and, with concurrence from site senior-level management, authorizing FMR waivers.

4.2.2 Providing clarifications on applicability of overtime limits.

4.2.3 Ensuring individual work hours are managed with the objective to prevent impairment from fatigue due to the duration, frequency, sequencing of successive shifts or call-in, or incidental duties.

4.2.4 Performing reviews as requested by the vice president nuclear generation or Station Director.

4.3 Supervisors, or managers when evaluating supervisors, are responsible for:[T34188]

4.3.1 Ensuring no personnel exceed 10 CFR 26 Subpart I work hour limits without appropriate prior authorization and waiver.

4.3.2 Ensuring personnel transitioning from non-covered work to covered work include all hours worked in their work hour calculations.

4.3.3 Assessing personnel fitness to perform assigned work within four (4) hours of covered work performance.

4.3.4 Ensuring assigned personnel have the correct FMR classification code indicated in the site computer system.

4.4 Section managers are responsible for conducting:

4.4.1 A quarterly review of section personnel work hour reports for violations and waivers to evaluate FMR compliance.

4.4.2 The section FMR representative may assist the manager with the review.

4.5 Department directors are responsible for conducting:

4.5.1 Annual review of department personnel work hour reports for violations and waivers to evaluate FMR compliance.

4.5.2 The department FMR representative may assist the director with the review.

4.6 Station personnel are responsible for:[T34188]

4.6.1 Being capable of performing assigned work.

4.6.2 Reporting fatigue.

4.6.3 Being aware of hours worked in previous 14 days.

4.6.4 Knowing applicable overtime limits.

4.6.5 Obtaining approval to work overtime.

4.6.6 Timely entry of work schedule changes in tracking software so potential violations are identified and addressed before a violation occurs.

4.7 Quality verification director is responsible for:

4.7.1 Ensuring FFD audits are performed at the appropriate frequency, scope, and depth.

4.7.2 Reviewing and approving FFD audit reports and related audit documents.

4.8 Quality verification personnel are responsible for:

4.8.1 Coordinating and conducting FFD audits at the appropriate frequency, scope, and depth

4.8.2 Preparing and submitting FFD audit reports and related audit documentation

4.9 Payroll supervisor is responsible for retaining records of hours worked and FMR waivers for three (3) years.

4.10 Access/FFD manager is responsible for:

4.10.1 Gathering and reporting data to NRC per 10 CFR 26.203(e).

4.10.2 Coordinating annual effectiveness review of work hour control per 10 CFR 26.205(e).

5. INSTRUCTIONS

5.1 Covered Work

5.1.1 General Provisions

a. Managers and directors should complete periodic reviews of program violations and waivers to evaluate program health.

1. Managers should review FMR reports on a quarterly basis and directors on an annual basis.

a) FMR representatives may assist the manager or director with the review. SAPN will be used to track the reviews for covered work.

2. The access/FFD manager should assign tasks from a SAPN to track reviews completed by managers and/or directors.

b. Audits

NOTE:	FMR Program audits are conducted during the FFD Program audit performed by quality.

1. Quality shall audit the management of worker fatigue by reviewing all electronic and hard copy information retained to track work performed under the fatigue management program. Such information may include:

a) FMR waiver forms

b) Electronic time reporting records

c) Payroll summary reports

2. Audits shall focus on the effectiveness of the fatigue management program.

3. The individuals performing the audit of the program shall be independent from both the subject FFD program's management and from personnel who are directly responsible for implementing the FFD program.

4. The result of the audits, along with any recommendations, shall be documented and reported to site senior-level management.

5. Each audit report shall identify:

    a) Conditions that are adverse to the proper performance of the FFD program

    b) Cause of the condition(s)

    c) Recommended corrective actions, when appropriate

6. Review of audit findings shall require corrective actions, including re-auditing of the deficient areas where indicated, to preclude, within reason, repetition of the condition.

7. The resolution of the audit findings and corrective actions shall be documented in the corrective action program.

8. Audits shall be performed on 24 month cycle.

c. Reports

1. Payroll shall provide a summary for of all instances during the previous calendar year in which work hour controls were waived.

    a) The summary shall include only those waivers under which work was performed.

2. If it was necessary to waive more than one work hour control during any single extended work period, the summary of instances shall include each of the work hour controls that were waived during the period.

    a) When creating the report, each work hour control waived on a single waiver counts as a separate waiver.

3. For each category of workers specified, the station shall:

    a) Report the number of instances in which each work hour control specified was waived for workers not working on outage activities.

    b) Report the number of instances in which each work hour control was waived for workers working on outage activities.

    c) Provide a summary that shows the distribution of waiver use among the workers within each category of workers identified (e.g., a table that shows the number of workers that received only one waiver during the reporting period, the number of workers that received a total of two waivers during the reporting period, etc.).

    d) Provide a summary of corrective actions, if any, resulting from the analyses of data, including fatigue assessments.

4. Reports for only waivers actually used shall be provided to the NRC when requested. The reports shall include:

    a) The name of the worker performing the work.

    b) The name of the worker's supervisor.

    c) A description of the work performed.

    d) The outcome of the work performed.

    e) The need for the waiver.

    f) The name of the person authorizing the waiver.

    g) The name of the supervisor approving the waiver.

5. Reports covering all instances where FMR violations occurred and waivers were not issued shall be provided to site senior-level management. The reports shall include the information requested in step 5.1.1c.4.

6. Reports related to fatigue management can be integrated into the overall FFD report and may be submitted electronically using EIE system and the NRC provided format.

7. Reports shall be generated every 12 months.

    a) The initial reports generated under this procedure shall cover the period October 1, 2009, through December 31, 2009.

    b) Subsequent reports shall cover the period January 1 through December 31.

    c) Reports for data collected shall be submitted to the NRC before March 1 of the following year.

5.1.2 Affected Personnel

NOTE:	For the purposes of compliance with the FMR, directing only applies to operations and maintenance activities.

a. Any workers on-site with unescorted access who perform work within any of the following job categories are considered covered workers subject to work hour controls.

1. Operations

a) Workers operating or on-site directing of work activities for SSCs that a risk-informed evaluation process has shown to be significant to public health and safety.

b) Workers performing the duties of operations responders who are specifically designated due to their understanding of the effects of fire and fire suppressants on safe shutdown capability.

2. Maintenance

a) Workers performing on-site maintenance or on-site directing of work activities for SSCs that a risk-informed evaluation process has shown to be significant to public health and safety.

3. Radiation Protection and Chemistry

a) Workers performing duties which are part of the on-site Emergency Response Organization (ERO) minimum shift complement.

b) Support staff is not covered by the FMR.

4. Security

a) Workers performing duties including but not limited to an armed responder, Zebra, Nora, Alarm Station Officer, Watch Commander, Response Team Leader, or Nuclear Security Sergeant.

5. Other Personnel

a) Any other workers normally considered non-covered workers performing operations or maintenance activities addressed in steps 5.1.2a.1, 5.1.2a.2, 5.1.2a.3, and 5.1.2a.4.

1) The FMR may apply to other personnel who, without further oversight, provide direction to operations and maintenance covered workers.

2) If non-covered workers perform covered work, the covered work restrictions since the beginning of the cycle (evaluation period) apply until the covered work is complete.

3) If the normally non-covered worker performs covered work intermittently throughout the cycle, he or she should be left as "covered" throughout the cycle.

(a) The fatigue rule covered indicator is tracked in the site computer system on the personnel screen using the Nuclear Fatigue Rule (NFR) Covered Worker field.

(1) Supervisors and managers may review the personnel screen in the site computer system to determine covered status for their staff.

(2) Whenever an individual is processed for unescorted access the NFR Covered Worker field defaults to covered status.

(3) When an individual in a non-covered status changes organizations, the status will be evaluated by the fatigue owner to determine if they need to return to covered status.

5.1.3 All site personnel should make timely entry of work schedule changes in tracking software so potential violations are identified and addressed before a violation occurs.

5.1.4 Fatigue Assessments

a. Requirements for Fatigue and Waiver Assessments

1. Assessments shall be conducted face to face with the worker whose alertness may be impaired.

2. At a minimum, the assessments shall address the worker's work history for the past 14 days while considering the following factors:

a) Acute fatigue

b) Cumulative fatigue

c) Circadian factors

3. The assessor shall not conclude that fatigue has not or will not degrade the worker's ability to safely and competently perform his or her duties solely on the basis that the worker's work hours have not exceeded any of the limits specified or that the worker has had the minimum breaks required or minimum days off required, as applicable.

4. The results of any assessment conducted shall be documented including a description of the circumstances that necessitated the fatigue assessment and any controls and conditions that were implemented.

a) If a worker disagrees with the results of an assessment, the worker may request a second assessment by a trained assessor.

5. The Fatigue Management Rule Program owner shall prepare an annual summary of instances of assessments that were conducted during the previous calendar year for any worker for which a fatigue assessment was performed.

a) The summary shall include:

1) The conditions under which each assessment was conducted (i.e., self-declaration, for cause, post-event, or follow up).

2) A statement of whether or not the worker was working on outage activities at the time of the self-declaration or condition resulting in the assessment.

3) The category of duties the worker was performing at the time of the self-declaration or condition resulting in the assessment.

4) Management actions, if any, resulting from each assessment.

6. If a worker was determined to be fit for duty and he or she disagrees with the finding, the work supervisor shall consider the impact of the worker working under distress.

    a) The work supervisor should contact his or her management to discuss options and trending.

7. Workers shall provide complete and accurate information that may be required to address the factors listed in step 5.1.4b.6.

    a) Inquiries shall be limited to only the personal information necessary to assess the factors.

b. Fatigue Assessments

1. Fatigue assessments shall be documented on the Fatigue Assessment Form, Form 69-21350.

    a) The completed form shall be

        1) Documented in a SAPN notification

        2) Forwarded to the access/FFD manager.

2. Fatigue assessments shall be conducted under the following conditions:

    a) For cause

        1) In addition to any other test or determination of fitness that may be required, a fatigue assessment shall be conducted in response to an observed condition of impaired individual alertness creating a reasonable suspicion that a worker is not fit to safely and competently perform his or her duties, except if the condition is observed during a worker's break period.

        2) If the observed condition is impaired alertness with no other behaviors or physical conditions creating a reasonable suspicion of possible substance abuse, DCPP need only conduct a fatigue assessment.

            (a) If there is reason to believe that the observed condition is not due to fatigue, a fatigue assessment is not required.

            (b) The access/FFD manager shall be consulted to determine if a for-cause FFD test will be conducted per OM14.ID5.

b) Self-declaration

1) A fatigue assessment shall be conducted in response to a worker's self-declaration to his or her supervisor that he or she is not fit to safely and competently perform his or her duties for any part of a working tour because of fatigue, except if, following the self-declaration, the station permits or requires the worker to take a rest break of at least 10 hours before the worker returns to duty.

c) Post-event

1) A fatigue assessment shall be conducted in response to events requiring post-event drug and alcohol testing as specified in OM14.ID5.

(a) Necessary medical treatment shall not be delayed in order to conduct a fatigue assessment.

d) Follow up

1) If a fatigue assessment was conducted for cause or in response to a self-declaration, and the worker returns to duty following a break of less than 10 hours in duration, the worker shall be reassessed for fatigue as well as the need to implement controls and conditions before permitting the worker to resume performing any duties.

3. In the case of a fatigue assessment conducted for cause, the individual who observed the condition of impaired alertness may not conduct the fatigue assessment.

4. The supervisor performing the fatigue assessment should be a qualified BOP supervisor and qualified to direct the work performed by the worker.

a) If the BOP supervisor is not available, another qualified BOP supervisor may be used (i.e., security or operations supervisor).

5. In the case of a post-event fatigue assessment, the individual who conducts the fatigue assessment may not have:

a) Performed or directed (on site) the work activities during which the event occurred.

b) Performed, within 24 hours before the event occurred, a fatigue assessment of the workers who were performing or directing (on site) the work activities during which the event occurred.

c) Evaluated or approved a waiver of the limits specified for any of the workers who were performing or directing (on site) the work activities during which the event occurred, if the event occurred while such workers were performing work under that waiver.

6. A fatigue assessment shall provide the information necessary for management decisions and actions in response to the circumstance that initiated the assessment.

7. Upon notification of a self-declaration of fatigue or stress by security personnel, the security watch commander shall:

a) Perform a fatigue assessment to ensure the symptoms, contributing factors, and effects of fatigue or stress do not adversely affect the employee's performance, except if following the self-declaration, the station permits or requires the worker to take a rest break of at least 10 hours before the worker returns to duty.

b) Document the basis of the recommendation and forward it to the security manager for review and approval and generate a notification documenting the review and approval.

c. Waiver Assessments

1. If there is no supervisor on site who is qualified to direct the work, the assessment may be performed by a supervisor who is qualified to provide oversight of the work to be performed. This may be a second level supervisor or manager.

2. Following a fatigue assessment, the assessor shall determine and implement the controls and conditions, if any, necessary to permit the worker to resume performing duties, including the need for a break.

5.1.5 Directing Work

a. For the purposes of compliance with the FMR, "directing" applies only to the following operations and maintenance activities:
   - On-site directing of the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety.
   - On-site directing of maintenance on SSCs that a risk-informed evaluation process has shown to be significant to public health and safety.

b. Directing may apply to personnel who, without further oversight, provide direction, to covered workers from operations and maintenance.

   1. If non-covered workers direct covered work, the covered work restrictions since the beginning of the cycle (evaluation period) apply until the covered work is complete.

      a) If the normally non-covered worker directs covered work intermittently throughout the cycle, he or she should be left as "covered" throughout the cycle.

c. Consideration should include all of the following when determining if an individual is directing an operations or maintenance activity:

   1. Is the individual on site?

   2. Is the individual the first line supervisor or foreman?

   3. Is the individual directly involved in the execution of the work activity?

   4. Is the individual making technical decisions for that activity without subsequent technical reviews?

   5. Is the individual ultimately responsible for the correct performance of that work activity?

d. The following tasks are examples of activities generally considered NOT directing:

   1. Engineering tasks

   2. Supervising maintenance on a non-covered SSC

   3. Supervising at second level supervision

   4. Conducting work control center documentation activities

   5. Writing a work procedure

   6. Preparing a work or modification package

7. Training personnel during which time the trainee is not operating or performing maintenance activities

8. Reviewing and approving documents

9. Performing any work that is not operations or maintenance on risk significant SSCs (refer to Attachment 1)

10. Technical staff providing recommendations to control room staff

11. Senior management reviewing work plans

12. Contractors, vendors, or engineers providing recommendations on test performance, component and system operation, or other similar technical inputs

e. Position alone should not be the deciding factor when determining personnel covered by the FMR. For example, a Shift Manager is a second level supervisor, but, in practice and as provided in 10 CFR 26, has the authority to direct covered activities.

1. Analyze and evaluate all criteria prior to determining applicability or exclusions.

5.1.6 Minimum Days Off (MDO)

a. The requirements outlined in this section only apply during the first 60 days of an outage.

Table 1: Required Minimum Days Off for Various Shift Schedules (Outage)

Group	8-Hour Shift	10-Hour Shift	12-Hour Shift
Maintenance	1 day off/in any 7-day period	1 day off/in any 7-day period	1 day off/in any 7-day period
Operations, Radiation Protection, Chemistry, Ops responder	3 days off/successive (i.e., non-rolling) 15-day period	3 days off/successive (i.e., non-rolling) 15-day period	3 days off/successive (i.e., non-rolling) 15-day period
Security	4 days off/successive (i.e., non-rolling) 15-day period	4 days off/successive (i.e., non-rolling) 15-day period	4 days off/successive (i.e., non-rolling) 15-day period

1. The option of keeping workers on normal operations work hour restrictions is still available during outages.

2. The table above applies to the first 60 days of a unit outage; after this 60-day period expires, normal online work hour limits shall apply.

   a) The 60-day period may be extended seven days for a worker for each 7-day block during which they work 48 hours or less.

   b) Multiple 7-day extensions may be given to a worker as long as the 7-day blocks are not overlapping.

3. Minimum days off may be scheduled any day of the week.

   a) Maintenance shall meet at least one day off in a 7-day rolling period.

   b) For all other covered workers, there is no restraint as to when required days off occur during the 15-day fixed period.

b. For purposes of work hour calculations, average hours worked, and minimum days off calculations, work hours in response to the following situations are excluded from meeting 10 CFR 26, Subpart I requirements:

1. Plant emergencies as defined in the Emergency Plan.

   a) After a declared emergency drill is terminated, employees require a 10 hour break before the start of the next shift to reset their FMR hours.

   b) Employees require a 34 hour break before the start of the next shift if they have not had a 34 hour break in the previous 9 days.

2. Unannounced emergency preparedness exercises and drills (unscheduled work hours ONLY).

    a) After an unannounced drill is terminated, employees require a 10 hour break before the start of the next shift to reset their FMR hours.

    b) Employees require a 34 hour break before the start of the next shift if they have not had a 34 hour break in the previous 9 days.

3. Security response.

    a) Force-on-force tactical exercises: Exclude hours worked by security personnel during the actual conduct of NRC evaluated force-on-force tactical exercises when calculating the worker's average work hours.

    b) Common defense and security: When informed in writing by the NRC that the requirements of the FMR are waived for security personnel to ensure the common defense and security, workers exclude FMR requirements for the duration of the period defined by the NRC.

c. If one or both units are in an outage, those licensed operators composing the minimum shift complement of operators required under 10 CFR 50.54(m) for the operating unit, including the operator at the controls specified in 10 CFR 50.54(k) and the senior operator in the control room required under 10 CFR 50.54(m)(2)(iii), are not eligible for the MDO requirements permitted by 10 CFR 26.205(d)(4).

    1. 10 CFR 26 Subpart I does not prohibit these individuals from performing outage activities.

        a) An operator who has been working outage work hours and has had 2 days off in the previous 7-day period may provide relief to the operator at the controls or the senior operator in the control room, if an appropriately qualified operator who has been working nonoutage work hours is not immediately available to provide relief.

b) If an operator who has been working outage work hours and has had 2 days off in the previous 7-day period is not immediately available, an operator who has been working outage hours may provide either:

1) Short-term relief (up to 2 hours) for the operator at the controls or the senior operator in the control room without a waiver.

2) Longer term relief (more than 2 hours) under a waiver of the MDO requirement that is applicable to the shift schedule (i.e., 8-, 10-, or 12-hour shifts) for personnel assigned to the operating unit.

2. When one unit is in an outage and there is one unit operating, the FMR requires 2 reactor operator (RO) licenses and 2 senior reactor operator (SRO) licenses assigned to the shift to be working under nonoutage work restrictions.

a) At least one RO shall be at the controls of the reactor and one SRO shall be in the control room.

d. Workers performing or directing work who are normally non-covered assume the covered work requirements for their assigned department to perform or direct covered work for the length of their assignment and for the work history in the cycle, prior to performing or directing the covered work.

e. Workers temporarily performing or directing covered work who do not leave their normal work department and are normally non-covered, shall follow maintenance work requirements. For example, an engineer giving direction to maintenance workers for a specific job without further oversight is required to meet maintenance covered work requirements for the length of the job and for his or her work history in the cycle.

5.1.7 Work Hour Limits

a. The following limits apply to covered workers regardless of unit status:

1. No more than 16 work hours in any 24-hour period.

2. No more than 26 work hours in any 48-hour period.

3. No more than 72 work hours in any 7-day period.

4. At least a 10-hour break between successive work periods, or an 8-hour break when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts.

5. A 34-hour break in any 9 day period.

b. Workers performing covered work while the station is on-line are limited to 54 work hours per week when averaged over the rolling 6-week cycle.

c. The following limits apply for workers performing covered work during outages:

1. Minimum days off:

a) 1 day off per week for maintenance personnel.

b) 3 days off for operations, radiation protection, chemistry, and operations (fire) responder personnel every 15 days.

c) 4 days off for security personnel every 15 days.

5.1.8 Breaks

a. Workers shall have, at minimum, the rest breaks specified in step 5.1.7.

b. For the purposes of this section, a break shall be an interval of time that falls between successive work periods, during which the worker does not perform any duties other than one period of shift turnover either at the beginning or at the end of a shift, but not both, for purposes of break calculation. Refer to step 5.1.12a for turnover exceptions related to minimum break between shifts and a 34 hour continuous break in 9 days.

5.1.9 Sanctions and Disciplinary Actions

a. Workers shall report to work fit for duty and on schedule.

b. Workers exhibiting chronic self-declaration that they are not fit for duty as a result of fatigue should be considered for referral to the employee assistance program.

c. Workers exhibiting chronic self-declaration that they are not fit for duty as a result of fatigue, absent a sound medical reason, may be subject to disciplinary action.

1. Personnel are required to be fit for duty and get sufficient rest to ensure they are not subject to fatigue.

a) Persons who make choices that result in less than the sleep necessary for that person to remain alert and avoid fatigue are not meeting their obligation per this rule.

d. The refusal on the part of a worker to submit to a fatigue assessment shall subject the worker to disciplinary action and possible removal from unescorted access.

1. Facts to be considered in assessing disciplinary action shall include the employee's job assignment and past work record.

e. Personnel subject to the fatigue assessments who refuse to be assessed shall be considered fatigued and unable to perform their duties.

1. Time away from work for fatigue management recovery shall be classified as personal time off, if available, or non-paid time.

5.1.10 Schedule Transitions

a. An 8 hour break shall only be allowed before the first shift of the new schedule.

b. A worker shall have a continuous 34 hour break in any rolling 9 day period.

c. The MDO requirements shall be met for outage schedules.

d. Outage schedules.

e. Schedule transitions, when output breakers change state, may present problems and should be addressed on a case by case basis for covered workers entering an outage.

1. Follow outage rules if the plant experiences an unplanned trip.

a) If the schedule before the trip would have provided for work hours and breaks within the FMR, no violation of the FMR occurs.

2. When the outage is planned, ensure the schedule meets all work hour and minimum break requirements prior to breaker opening in order to assume outage requirements.

3. A short cycle (less than 6 weeks) occurs in order to have plant personnel resume their normal 6 week cycle. Refer to step 5.1.10h.3.

4. Consider AVG 54 requirements and hours worked.

f. Workers may work 72 hours in a 7 day period the week before or after outages as long as the following conditions are met for the non-outage schedule:

1. The average hours worked

2. MDO requirements during the outage.

g. Transition from covered work to non-covered work presents no problem for the FMR.

1. While performing non-covered work, FMR restrictions do not apply for the worker; however, exceeding overtime limits prescribed the FMR requires notification to the worker's management.

h. If transitioning into or out of an outage, normal operations work hour rules apply.

1. Outage hours start the shift following breaker opening.

2. Non-outage hours start the shift following breaker closing.

3. A new evaluation period may be used at the completion of an outage.

4. Post-outage transitions are in compliance if the schedule for the evaluation period would have provided for the required average days off and the average non-hours worked.

5. If the interval between outages for a worker is less than nine (9) days, then the worker shall have a 34-hour break period and shall not exceed the following limits:

a) 16 work hours in any 24-hour period

b) 26 work hours in any 48-hour period

c) 72 work hours in any 7-day period

6. A minimum of 2 days off in the preceding 7-day period may be acceptable for operators who have been working outage hours on 10- or 12-hour shifts before they transition to the non-outage unit as one of the two required operators working non-outage minimum days off.

a) This applies only during outages when transitioning a specific SRO or RO from the outage unit to the non-outage unit.

b) This does NOT apply when a nuclear operating unit transitions from an outage to on-line operations.

7. When entering an unplanned outage, the station shall be considered in compliance with the FMR if the schedule for the evaluation period would have provided for the required days off.

8. For the purposes of compliance with the minimum days off requirement, shifts worked by security personnel during the actual conduct of NRC-evaluated force-on-force tactical exercises when calculating the worker number of days off may be excluded.

9. When entering an outage or any evaluation period less than one week in duration, the evaluation period MDO is calculated using the ratio of the number of days off per week required for a 7 day period to the number of days worked in the partial week for the covered classification.

    a) If x is <0.5, drop the value.

    b) If x is ≥ 0.5, make a whole day off required.

$$\frac{x}{y} = \frac{z}{7}$$

where x = Required days off for partial week
y = Number of days worked in partial week
z = Number of required days off in seven (7) days

5.1.11 Self-Declaration

a. All workers shall have the right to self-declare.

b. If called to come into work, the worker should inform the supervisor placing the call that he or she is unfit for duty due to fatigue or stress.

    1. Security personnel shall immediately report to their immediate supervisor, or the security watch commander, if any instances arise while performing work that may cause them to be unfit for duty due to fatigue or stress.

c. If a worker is working under a waiver and declares he or she is too fatigued to safely perform their duties, they shall be removed immediately from risk significant duty, unless the worker is required to continue performing that duty under other requirements.

    1. If the worker shall continue performing the risk significant duty, the station shall take immediate action to relieve the worker.

d. If a worker declares he or she is too fatigued to safely perform their duties during any part of the assigned work schedule, a fatigue assessment shall be performed.

    1. The worker may forego the fatigue assessment if a 10-hour rest break is given before the worker returns to work.

    2. The worker may return to non-risk significant duties if fatigue assessment is satisfactory.

5.1.12 Shift Turnover

a. When calculating breaks, either on-coming or off-going shift turnover may be excluded from the calculation of a worker's work hours, but not both.

    1. Turnover on both ends of a shift is excluded except for a Minimum Break Between Shift (MBBS), 10 hour break, and a 34 hour continuous break in 9 days break calculations.

b. Shift turnover includes only those activities that are necessary to safely transfer information and responsibilities between two or more workers between shifts.

c. Shift turnover activities may include, but are not limited to, discussions of the status of plant equipment, and the status of ongoing activities, such as extended tests of safety systems and components.

1. Shift turnover may include the time required for security personnel to arm and disarm.

d. Work hours worked during turnovers between workers within a shift period due to rotations or relief within a shift shall not be excluded.

1. Other activities that shall not be excluded from work hours calculations include, but are not limited to:

a) Shift holdovers to cover for late arrivals of incoming shift members

b) Early arrivals of workers for meetings, training, or pre-shift briefings for special evolutions

c) Holdovers for interviews needed for event investigations.

e. Time should be accounted for in 15 minute increments.

5.1.13 Training

a. All site personnel shall receive FMR CBT training as part of the badging and access process.

1. All directors, managers, and supervisors shall receive training on their specific areas of the FMR procedure.

2. All Shift Managers, security watch commanders, and site senior-level managers shall receive training to delineate and define conditions adverse to public health and safety and plant security. Refer to Attachment 2 for guidance on such conditions.

5.1.14 Transition to Covered Work

a. A worker transitioning from non-covered work to covered work shall meet all requirements for the covered worker:

1. The worker shall meet the MDO requirements for the work group he or she is entering.

2. The worker shall have had a continuous 34 hour break in the previous 9 days.

3. The worker shall have a 10 hour break before starting covered work.

4. A look-back shall be performed to ensure the worker has not exceeded maximum working hours in the past 7 days and the 54 hour average has or will not be exceeded for the cycle.

    a) This may also include AVG 54 requirements for the cycle.

5. A look ahead shall be performed to ensure MDO requirements are met for the covered work group entered.

b. Contractors or vendors performing covered work shall:

1. Follow work hour rules in this procedure.

2. Not count their work hours and days off prior to arriving on site.

5.1.15 Waivers

a. Waivers are only applicable to covered workers performing covered work. Examples of instances that would most likely meet the threshold for a waiver include:

1. A safety-related SSC fails placing the unit in a shutdown LCO.

2. A worker, who is part of the minimum shift complement, must be held over due to relief not available.

b. A list of authorized waiver issues is provided in Attachment 2.

c. Staffing levels should be sufficient so that schedules for covered workers may be maintained based on vacation and training demand without relying on waivers.[Ref 7.5]

1. While it is expected and allowed that normal variation in vacation and training demand may occasionally require additional work hours to be used, management shall consider the total vacation, training, and workload demands in order to maintain sufficient staff to execute work.[Ref 7.5]

d. When informed in writing by the NRC that the FMR requirements are waived for security personnel to ensure common defense and security, the requirements specified in the FMR do not apply for the duration of the period defined by the NRC.

e. Waiver Requirements

1. Waivers shall be granted on an individual basis and only to address circumstances that could not have been reasonably controlled.

2. Waivers may be granted if either:

    a) A Shift Manager, with concurrence from a site senior-level manager, determines that the waiver is necessary to mitigate or prevent a condition adverse to safety.

    b) The security watch commander, with concurrence from a site senior-level manager, determines that the waiver is necessary to maintain site security.

    c) A site senior-level manager determines if a waiver is necessary to mitigate or prevent a condition adverse to safety or to maintain site security.

3. The cognizant supervisor shall perform a face-to-face waiver assessment on the worker to determine if there is reasonable assurance that the worker will be able to safely and competently perform assigned duties during the additional work period for which the waiver will be granted.

    a) The supervisor performing the waiver assessment shall be FFD qualified.

    b) The supervisor performing the waiver assessment shall be qualified to direct the work (or related work) to be performed by the worker.

        1) If there is no supervisor on-site who is qualified to direct the work, the assessment may be performed by a trained supervisor who is qualified to provide direction of the work to be performed by the worker.

    c) Waiver assessments prior to the worker performing any work under the waiver shall be performed no more than 4 hours before the work activity.

    d) At a minimum, the waiver assessment shall address:

        1) The potential for acute and accumulative fatigue considering the worker's work history for at least the past 14 days.

        2) The potential for circadian degradations in alertness and performance considering the time of day for which the waiver shall be granted.

        3) The potential for fatigue-related degradations in alertness and performance to affect risk-significant functions.

        4) Whether any controls and conditions are required under which the worker shall be permitted to perform work.

4. The documented basis for a waiver shall include:

   a) The circumstances that necessitate the waiver.

   b) A statement of the scope of work.

   c) A time period for which the waiver is approved.

   d) The bases for the approval of the waiver.

5. Waivers shall be tracked in the corrective action program.[T34188]

6. The station does NOT need to meet the waiver requirements during declared emergencies as defined in the Emergency Plan or unannounced ERO drills.

   a) After a declared emergency or unannounced drill is terminated, employees require a 10 hour break before the start of the next shift to reset their FMR hours.

   b) Employees require a 34 hour break before the start of the next shift if they have not had a 34 hour break in the previous 9 days.

7. Waivers are not required for changing to and from daylight savings time.

f. Waiver Process

   1. Only one work period shall be waivered per FMR Waiver Form, Form 69-21349.

   2. Immediate supervisor shall complete a FMR Waiver Form.

      a) List the condition adverse to safety or site security requiring resolution.

   3. Shift Manager or security watch commander, with concurrence from a site senior-level manager, shall authorize a FMR waiver on the FMR waiver form.

   4. If condition is determined to NOT be a condition adverse to safety or site security, the waiver is not valid and FMR work hour limits shall not be exceeded.

5. Once the Shift Manager, security watch commander, and designated site senior-level manager authorizes the waiver, the immediate supervisor shall:

    a) Perform a face-to-face supervisory assessment on the worker no more than 4 hours prior to exceeding FMR work hour limits using the following guidance:

        1) Potential for acute fatigue—time since last 10 hour break.

        2) Potential for cumulative fatigue—review 14-day work history.

        3) Consider if the worker had adequate opportunity to obtain sufficient rest considering the length and sequencing of break periods, available sleep periods, and transitions that may have interfered with quality sleep.

        4) Circadian factors—time of day and recent work cycle.

        5) Consider the time of day/night the work will be performed relative to the worker's recent shift schedules.

        6) Observation and statements of the worker.

        7) How fatigue could affect the work quality, if at all.

        8) Nature of work to be performed.

    b) Document the supervisory assessment.

    c) Determine if there is reasonable assurance that the worker will be able to safely and competently perform assigned duties during the additional work period for which the waiver will be granted.

    d) Determine if there should be any restrictions on the worker that will be assigned duties during the additional work period for which the waiver will be granted.

    e) Document the reasonable assurance determination and any restrictions.

    f) Initiate a tracking notification. One notification per waiver is created with work type of "PROG FMR."

6. Worker shall sign the FMR waiver form agreeing they are fit for duty to conduct the planned work under waiver.

7. The immediate supervisor shall perform closeout review promptly after the waiver period and complete the close out section of the FMR waiver form.

5.1.16 Work Hours

a. Work hour controls apply only to unescorted employees, contractors, or vendors performing or on-site directing covered work. Refer to step 5.1.16e for work hour control exemptions.

b. All hours worked at any nuclear station shall be counted as hours accumulated toward the work hour limitations specified for covered workers.

c. Work activities on both risk-significant and non-risk-significant SSCs contribute towards fatigue; therefore, all work hours shall be considered in the accumulated time related to work hour limitations.

d. Reviews shall be performed annually to evaluate effectiveness of work control hours.

1. If any plant or security system outages or increased threat conditions occurred since the most recently completed review, include in the review an evaluation of the work control hours during outages or increased threat conditions.

2. The review shall be completed within 30 days of the end of the review period.

3. The review shall include:

a) Actual work hours and performance of workers subject to this requirement.

b) Information from the corrective action program.

c) At a minimum, provide:

1) Workers whose actual hours worked during the review period exceeded an average of 54 hours per week in any evaluation period while the worker's work hours are subject to the FMR.

2) Workers who were granted more than one waiver during the review period.

3) Workers who were assessed for fatigue during the review period.

d) Worker's hours worked and the waivers under which work was performed to evaluate staffing adequacy for all jobs subject to the work control hours.

4. Document the methods used to conduct the review and the results of the review in a SAPN.

5. Document in the corrective action program any problems identified in maintaining control of work hours consistent with the specific requirements and performance objectives.

e. Work hour controls do not apply to the following individuals and activities:[Ref 7.5]

1. Maintenance activities on Maintenance Rule SSCs located off site.

2. Quality control and quality assurance activities.

3. Predictive maintenance activities that do not result in a change of condition or state of an SSC that a risk-informed evaluation process has shown to be significant to public health and safety may be excluded from covered work.

NOTE:	At times an activity requires starting or stopping a piece of equipment. The worker starting or stopping the equipment would be performing covered work under the operating category; however, the data collection would not be considered covered work.

a) Examples of activities that may be excluded if they do not change the state or condition of these SSCs include, but are not limited to:

1) Nondestructive Examination (NDE)

2) Thermography

3) Vibration analysis

4) Data collection and analysis

5) Reactor engineering analysis

4. Contractors or vendors, who are not granted unescorted access, conducting work on a risk-significant SSC on site.

5. Contractors or vendors making recommendations to plant personnel.

6. Emergency response personnel who do not perform radiation protection or chemistry duties required as a member of the on-site emergency response organization minimum shift complement.

7. Technical staff making recommendations to other plant personnel.

5.1.17 Work Hour Calculations

a. Work hour limits and the associated calculation and tracking of work hours apply to the workers performing covered work.[T34188]

1. This calculation includes both covered and non-covered work since the latter also contributes to fatigue.

b. Work hour accounting practices may be different from record keeping for payroll purposes or gate times.

c. Work hour records should show the number of hours worked each calendar day.

1. Work period start and stop times should be recorded and documented in a consistent manner.

d. Covered workers performing work while off-site shall report hours worked to the cognizant supervisor upon returning on-site.

1. The cognizant supervisor shall ensure any hours worked in excess of the schedule are included into the electronic tracking software.

2. The worker shall be aware of work hour restrictions and not exceed the restrictions without an approved waiver.

e. The calculated work hours shall include all time performing duties for work, including all within-shift break times and rest periods during which there are no reasonable opportunities or accommodations appropriate for restorative sleep. Work hours include but are not limited to:

1. Shift holdovers to cover for late arrivals of incoming shift members.

2. Early arrivals of workers for required meetings, training, or pre-shift briefings for special evolutions (these activities are not considered shift turnover activities).

3. Holdovers or early arrivals for interviews needed for event investigations.

4. Call-in work periods. The time between leaving the station and the call-in work period are also included if that time is less than 10 hours in duration.

f. That portion of a break or rest period during which there is a reasonable opportunity and accommodations for restorative sleep (e.g., a nap) may be excluded when calculating a worker's work hours.

g. Personal time in which an individual is on-site but is off duty (i.e., before or after his or her normally scheduled work period in which work activities are performed) may be excluded.

h. If a worker begins or resumes performing covered work during the calculation period, include in the calculation all hours worked, including hours worked performing non-covered work.

1. Control the worker's work hours per the requirements of this procedure.

i. Incidental unscheduled duties performed off-site (e.g., technical assistance provided by telephone from a worker's home), provided the total duration of the work does not exceed a nominal 30 minutes during any single break period, may be excluded.

1. The term "unscheduled" is an integral part of the definition of "Incidental Duties". Once an activity is scheduled it no longer can be called an incidental duty and therefore the 30 minute time limit no longer applies and every minute a worker is performing the activity must be tracked in Workforce as time worked.

2. For the purposes of compliance with the minimum break requirements and the minimum day off requirements, such duties do not constitute work periods or work shifts if the nominal 30 minutes is not exceeded.

3. Time spent on incidental duties is cumulative.

a) The cumulative 30 minutes impacts the break period where the nominal 30 minute limit is exceeded.

j. Contractors or vendors shall track and report their hours to their supervisors between outages.

5.1.18 Work Hour Scheduling

a. Unscheduled work hours for the purpose of participating in unannounced emergency preparedness exercises and drills may be excluded when calculating actual hours worked.

1. After a declared emergency or unannounced drill is terminated, employees require a 10 hour break before the start of the next shift to reset their FMR hours.

2. Employees require a 34 hour break before the start of the next shift if they have not had a 34 hour break in the previous 9 days.

b. Work hours for covered workers shall be scheduled with the objective of preventing impairment from fatigue due to duration, frequency, or sequencing of successive shifts.

c. Supervisors should consider the following factors when establishing schedules:

   1. Work hour limits

   2. Consistent start and stop times for work periods

   3. Impact of shift rotations

   4. Training requirements

   5. Vacation scheduling

d. To determine if a worker may be called in to work, use the following guidelines to determine if the work hour limit will be exceeded.

   1. Hours worked should be evaluated to determine if any limit will be exceeded based on the work schedule by a backward look at the number of hours that have or will have been worked based on a time in the future (i.e., if the worker works at time T, how many hours will he or she have worked in the 24 hours/48 hours/7 days preceding time T relative to work hour limits as well as minimum days off and break requirements).

   2. When entering an unplanned outage, compliance with work hour limits is met if the schedule for the evaluation period would have provided the required average minimum days off.

   3. Deviations from overtime limits may occur as the result of administrative errors or unforeseen circumstances. A notification shall be initiated for each worker if this occurs.

      a) If an employee is actively engaged in covered work, remove the employee from covered activities at the earliest possible safe time to do so.

      b) If a waiver is warranted and no other work hour compliant individual is available to perform the work, process a waiver per step 5.1.15 prior to continuing.

      c) If the employee is not able to work under a waiver, safe transport home should be considered.

NOTE:	A worker is considered "reset" from deviation, whether under a waiver or otherwise, when they meet the hours worked and break requirements in step 5.1.7.

5.1.19 For the purposes of compliance with the maximum average hours worked requirements, supervisors may exclude shifts worked by security personnel during actual conduct of force-on-force tactical exercises evaluated by the NRC when calculating worker's number of days off.

a. Work hour requirements do not apply when informed in writing by the NRC that these requirements, or any subset thereof, are waived for security personnel in order to assure the common defense and security, for the duration of the period defined by the NRC.

5.1.20 Work Performed Off-Site

a. Work hours for unscheduled work performed off-site may be excluded from the calculation of a worker's work hours unscheduled work performed off-site (e.g., technical assistance provided by telephone from a worker's home) provided the total duration of the work, which is required by the leader, does not exceed a cumulative 30 minutes during any single break period.

b. For the purposes of compliance with the minimum break requirements and the minimum day off requirements, such duties do not constitute work periods or work shifts.

c. After hours study time that is not required by the company may be excluded from work hour calculations.[Ref 7.5]

1. As with any academic setting and curriculum, after hours study time varies from worker to worker.

2. Appropriate after hours study time compliments the utility provided training to ensure the learning process occurs and optimal information retention is achieved.

d. When considering work hour extensions for workers performing covered work, all hours worked by the worker shall be included. For example:

1. If a worker has performed 15 hours of non-covered work, and the worker is needed to perform additional covered work that extends beyond 16 hours in a 24 hour period, then a waiver to exceed the work hour limits shall be approved prior to the worker exceeding the 16 hour limit.

2. On the other hand, if the worker has performed 14 hours of covered work, and is needed to perform additional non-covered work, then the programmatic approvals of this document do not apply. However, the additional work hours are included in consideration of any other limits if the worker subsequently performs covered work.

5.1.21 Work Week Schedule

a. Supervisors shall review the actual hours worked and the performance of the workers subject to the FMR.

1. At a minimum, the review shall address:

a) Workers whose actual hours worked during the review period exceeded an average of 54 hours per week in any evaluation period while the workers' work hours are subject to the requirements of the FMR.

2. Use the Corrective Action Program to identify and evaluate the conditions which lead workers to work an average of more than 54 hours per week within an evaluation period.

b. An evaluation period shall not exceed six weeks for the purposes of calculating maximum average hours worked.

1. Each department should follow evaluation periods as defined in their respective labor agreements.

c. An eight (8) hour shift schedule is a schedule that shall not average more than nine (9) hours per workday over the entire evaluation period.

d. A ten (10) hour shift schedule is a schedule that shall not average less than nine (9) hours, but not more than eleven (11) hours, per workday over the entire evaluation period.

e. A twelve (12) hour shift schedule is a schedule that shall average more than eleven (11) hours, but not more than twelve (12) hours, per workday over the entire evaluation period.

5.2 Non-Covered Workers

5.2.1 Non-Covered Worker Requirements

a. Non-covered workers should arrive for work fit for duty and avoid fatigue in order to safely perform their duties.

b. Non-covered workers with unescorted access to the plant shall be subject to the requirements of 10 CFR 26.

c. Non-covered workers performing or directing non-covered work are normally expected to follow the FMR guidelines for minimum days off, overtime limits, and breaks associated with the maintenance organization.

d. Non-covered workers performing or directing non-covered work who enter time in the electronic time keeping system will receive warnings when the FMR is at risk of being exceeded; however, such warnings will not be identified or recorded as violations of the FMR.

e. Manager or higher level should approve non-covered workers exceeding FMR guidelines.

1. Non-covered workers should obtain such approval prior to exceeding the guidelines.

2. Managers who are non-covered workers should receive approval from a site senior-level manager prior to exceeding FMR guidelines.

3. Site senior-level managers who are non-covered workers do not require approval to exceed FMR guidelines.

f. Manager or higher level shall review and approve changing any covered worker to a non-covered worker status.

5.2.2 Non-Covered Worker Limits

a. Workers performing non-covered work shall obtain written approval from a vice president nuclear generation prior to working more than 20 consecutive work days.

1. Workers shall take two consecutive days off prior to returning to work.

b. Supervisors performing non-covered work shall obtain written approval from a vice president nuclear generation, the Station Director, prior to exceeding 13 consecutive work days.

5.3 Contractor/Vendor Work Hour Management Programs

5.3.1 PG&E may accept a contractor/vendor work hour management program in place of the DCPP program.

a. Contractor/vendor shall submit fatigue management procedure(s) and a description of software tool to PG&E for review and approval.

b. Contractor/vendor representative shall provide work hour monitoring reports on a weekly basis to the PG&E contract technical coordinator.

c. Contractor/vendor representative shall notify the PG&E contract technical coordinator of any potential work hour violations before the violation actually occurs.

d. The PG&E director responsible for implementation of the Fatigue Management Program shall approve the Contractor/Vendor Program before it is used.

e. The contractor/vendor shall notify the PG&E contract technical coordinator of any contractor/vendor fatigue management procedure or fatigue management software changes before they are implemented for use for work completed at DCPP.

f. Contractor/Vendor Program changes reported to the PG&E contract technical coordinator shall be approved for use by the PG&E director responsible for implementation of the Fatigue Management Program before implemented at DCPP.

6. RECORDS

6.1 Records generated by the use of this procedure include non-training records associated with work hour and related activity tracking, and training records.

6.2 Non-Training Records

6.2.1 Records generated through the implementation of this procedure include the following:

a. Records of work hours for workers who are subject to the work hour controls.

b. Records of shift schedules and evaluation periods of workers who are subject to the work hour controls.

c. The documentation of waivers including the bases for granting the waivers.

d. The documentation of annual work hour reviews including:

1. Documentation of the methods used to conduct the reviews.

2. Results of the reviews.

3. Documentation of any problems found during the reviews.

4. Actions taken under the corrective action program.

e. The documentation of fatigue assessments including assessments related to self-declarations.

6.2.2 The non-training records noted above shall be retained for three (3) years.

a. If there are legal proceedings related to fatigue management in progress at the end of the three year retention period, records shall be retained until the completion of all related legal proceedings.

b. These records do not meet the definition of quality records and therefore do not need to be retained in the records management system.

c. Non-training records may be retained by the department generating the documentation or the payroll group.

d. Non-training records may be generated in hardcopy format or retained electronically using a computer program.

6.2.3 Non-training records are not considered quality-related records.

6.3 Training records associated with fatigue management are considered quality related records and therefore shall be retained in the records management system.

7. REFERENCES

7.1 AD3.ID6, "Designation and Protection of Security Information"

7.2 NEI 06-11, "Managing Personnel Fatigue at Nuclear Power Reactor Sites"

7.3 NEI 06-11, Addendum, "Implementation Guidance for Maximum Average Work Hours Alternative"

7.4 NRC Regulatory Issue Summary 2011-08, "Fatigue Management During Hurricane Conditions"

7.5 Regulatory Guide 5.73, "Fatigue Management for Nuclear Power Plant Personnel"

7.6 10 CFR 26 Subpart I, "Managing Fatigue"

7.7 SAPN 50890593 "No Annual fatigue assessment summary created"

8. Turnover Time

8.1 The following table provides examples of acceptable and unacceptable turnover time activities.

Table 2: Turnover Time

ACCEPTABLE	UNACCEPTABLE
• Exchanging information with your supervisor, peer, or crew • Exchanging information with personnel assuming job duties or responsibilities (During watch or job turnover requiring two people, both are considered on turnover time.) • Familiarizing yourself with your areas of responsibilities • Crew briefing • Discussing safety issues (safety meeting, safety concern, etc.)	• Authorizing or directing work assignments • Performing repairs • Performing a test • Reviewing test data • Monitoring work activities • Standing a watch • Attending training • Attending section meetings • Reviewing an order for closure • Taking a welder qualification test • Obtaining and carrying materials and tools to the work area • Investigative interviews

8.2 A director, manager, Shift Manager, or security watch commander shall preauthorize other activities that may fall within the definition of turnover time but are not listed above.

Maintenance Rule Risk Significant Systems

Attachment 1: Page 1 of 1

SYSTEM	SUBSYSTEM	NAME
03B	01 02 03	AUXILIARY FEEDWATER
04B	01 02 05 07 08 09	TURBINE STEAM SUPPLY-UPSTREAM MSIV
04C	04	TURBINE STEAM SUPPLY-S/G BLOWDOWN
07A	01 02 04	RCS
08A	01 02 04 05 07	CVCS
09	01 02 03 05	SI
10	01 02 04 05	RHR
12	01 02	CONTAINMENT SPRAY
14	01	CCW
16A	01	SAFETY RELATED MU WATER
17B	01 02	AUX SALTWATER
21A	01	D/G
21B	01 02	D/G FUEL TRANSFER
23B	01	MAIN AUX BLDG HVAC
23C1	01	MISC AUX BLDG HVAC
23F1&2	01	CONTROL ROOM HVAC
24	01	GASEOUS RADWASTE
25B	01	BACKUP AIR & N2
36	01	EAGLE 21
37	01	NUCLEAR INSTRUMENTATION
38	01	SSPS
41A	01 02	CONTROL ROD-MECHANICAL
41B	01	CONTROL ROD-ELECTRICAL
45B	01	CONTAINMENT ISOLATION VALVES
62	04	12KV
63A	01	4KV VITAL BUSSES
63B	02	4KV NON-VITAL
64A	01	480V VITAL
65A	01	120V VITAL AC
67A	01 03	125VDC VITAL
69	01	230KV
80	01 02	CIVIL STRUCTURES
95	01	NUCLEAR FUEL
99	FLOCS	ASSOCIATED WITH THE PROCESS CONTROL SYSTEM (PCS)

Conditions Adverse to Safety or Site Security **Attachment 2: Page 1 of 1**

1. Conditions adverse to safety or site security are unforeseen conditions which, in the informed opinion of the duty Shift Manager or security watch commander, could jeopardize the safety or security of the public, station, personnel, or environment.
2. Waivers are considered appropriate if required to mitigate conditions adverse to safety or site security. If rule compliance could result in the following, but not limited to, type conditions, it would be appropriate to consider using the waiver process:
   a. Violate other NRC requirements such as minimum on-site staffing.
   b. Jeopardize the industrial or radiological safety of the public or plant personnel.
   c. Delay recovery from a challenge to a safety system function, if the compliance with the FMR would cause a forced reactor shutdown, power reduction, or other similar action as a result of exceeding a time limit for a Technical Specification Limiting Condition for Operation.
   d. Delay in recovering from actual or potential loss of reactor core cooling capability during outages.
   e. Cause a forced reactor shutdown, power reduction, or similar action as a result of exceeding a time limit for a Technical Specifications Limiting Condition for Operation.
   f. Result in an increase in Core Damage Frequency of greater than 1.0E-6, or similar program risk profile.
   g. Cause or prevent mitigation of an environmental permit violation.
   h. Compromise the ability to maintain the site secure from the actions of malicious groups or persons
   i. Force undue risk to on-site or off-site station personnel as a consequence of an external event (e.g., security, fire, or severe weather).

Fatigue Management Rule Waiver Form

Authorization to Waive Worker Work Hour Limits

This attachment should only be used if database is not available.

Date: Time:	Notification No.	Unit Status (check one) [ ] Outage [ ] Non-Outage

Waiver Period: Waiver Start: _____/_____ Waiver End: _____/_____
Date / Time Date / Time

NOTE: Only one work period shall be waivered per waiver form.

The following person is authorized to exceed the limits of 10 CFR 26

Print Name: (last, first)	Limits (see below)	Additional Time Authorized or Actual Break (see below)	Work Activity			
			OPS	HP/CHEM	MNT	SEC
LAN ID:						

Enter the letter code(s) for each of the applicable limits being exceeded under "Limits."

A. More than 16 hours in any 24-hour period (MWH16/24)
B. More than 26 hours in any 48-hour period (MWH26/48)
C. More than 72 hours in any 7 day period (MWH72)
D. Fewer than 10 hours between work periods (MBBS10)
E. Less than 34 hour break in the last 9 days (MBBS34/9)
F. More than 54 hours in a rolling 6 week period (AVG 54)
G. Minimum days off for outage requirements not met (MDO-OUT)

Enter the hours/day in excess of the appropriate limit in the "Additional Time Authorized/Actual Break" column.

Justification for exceeding work hour limits:

Description of work to be performed:

Circumstances that caused work hour extensions:

[ ] ERO Minimum Shift Staffing

[ ] Condition Adverse to Safety SAPN/Order Number: _____Order Priority: ___

[ ] Security Threat or Security Outage:

[ ] Necessary to maintain site security (explain):

Authorization to Waive Worker Work Hour Limits

If the worker will not be in compliance with the work hour limits when they return to work on their next scheduled day of work, then a new authorization to waive the worker work hours, including a new fatigue assessment, must be completed prior to allowing the worker to return to work.

Worker's work schedule has been checked and worker has been notified when he or she can return to work:
[ ] YES [ ] NO
Comments:

Waiver requested by: (Work supervisor or supervisor familiar with work to be performed)

_____/_____/_____
Print Name Signature Date

Waiver authorized by: (Shift Manager, security watch commander, or director or above with requisite signature authority)

_____/_____/_____
Print Name Signature Date

Concurrence by director or above:

_____/_____/_____
Print Name Signature Date

NOTE: Director concurrence may be verbal and/or by telephone, name shall be listed above. If a director authorizes the waiver then no additional concurrence is necessary.

The worker's supervisor will complete Fatigue Assessment per Attachment 4 prior to work beginning.
Fatigue assessment completed: [ ] YES [ ] NO
Comments:

If this waiver was not used, then this attachment should be voided. The voided attachment will not be a QA record and the WorkForce schedule should be updated with actual hours worked.

CLOSE-OUT

Print Name: (last, first)	Hours Worked under this waiver	Was work performed satisfactorily?	Database Updated?
LAN ID:		[ ] YES [ ] NO	[ ] YES [ ] NO

Comments:

Closed by:

_____/_____/_____
Job Supervisor Signature Date

Retention Instructions:
Department - Attach this form to electronic waiver.

Fatigue Assessment Form

Fatigue Assessment

Name:	Badge Number:	Fatigue Assessment or Waiver ID Number:

This assessment is intended to determine whether a degradation in a worker's cognitive and motor functioning have occurred due to the lack of rest and where fatigue is identified, establish appropriate controls and conditions ensuring the worker can safely and competently perform assigned duties. **Completed assessment shall be maintained as confidential.** As request, workers shall provide complete and accurate information necessary to address acute and cumulative fatigue and circadian variations in alertness and performance.

PART A	**Assessment of Fatigue and Work Hours**	**To be completed by worker being assessed.**

Assessment Type (check one)

[ ] WORK HOUR WAIVER	**[ ] FOR CAUSE**	**[ ] POST-EVENT**	**[ ] FOLLOW-UP**	**[ ] SELF-DECLARATION**
Assessment cannot be conducted more than 4 hours before the worker begins performing any work under the waiver.	Include description of observed behavior and name of worker who observed condition in comments.	Include description notification number of event and worker's involvement in comments.	Required when a worker is returned to work after a break of less than 10 hours following a for cause or self-declaration fatigue assessment.	Checking this box, completing this section and signing below indicates a formal self-declaration of fatigue.

Work history of the last 14 days to assess acute and cumulative fatigue and circadian variation in alertness and performance. This information is available from WorkForce on the waiver tab.

Past 14 day work history		14	13	12	11	10	9	8	7	6	5	4	3	2	1
Shift Schedule	Record D for days, N for nights or S for swing														
Hours Worked	Only include one shift turnover for time period														
34-hour break	Check the boxes of those days you've had a break of at least 34 hours before shift.														

Have you had a break of at least 10 hours between successive work periods in the last 14 days (or at least 8 hours if you were transitioning between shifts)? [ ] YES [ ] NO

Have all duties you've performed off-site, if applicable, met the definition of incidental (e.g., technical assistance provided by telephone from a worker's home)? [ ] YES [ ] NO [ ] N/A

How many hours of sleep have you had in the past 24 hours?

How many hours have you been awake?

How many hours of sleep have you averaged each day in the last 9 days?

Describe the work activity you are performing.

Do you feel you can perform this work activity without additional oversight? [ ] YES [ ] NO

Comments:

(Continued on page 2)

Fatigue Assessment

PART A (continued)

Are you mentally alert? [ ] YES [ ] NO
Comments:

Did factors outside of work keep you from obtaining adequate and regular rest (e.g., illness, family personal obligations)? [ ] YES [ ] NO
Comments:

Completed by: _____/_____/_____
Print Name Signature Date

PART B	**Supervisor Face-to Face Fatigue Assessment**

BOP supervisor directing or overseeing assessed worker: _____/_____
(Print Name) LAN ID

As applicable, worker observing the condition of impaired alertness: _____/_____[ ] N/A
(Print Name) LAN ID

BOP supervisor performing fatigue assessment: _____/_____
(Print Name) LAN ID

Assessment Guidelines:

- Only BOP supervisors with current plant access authorization may conduct fatigue assessments.
- If this assessment is for a waiver, it shall not be performed more than 4 hours before the start of the extended work period.
- When a fatigue assessment is conducted "For Cause," the person who observed the condition of impaired alertness shall not conduct the fatigue assessment.
- In the case of a post-event fatigue assessment, the worker who conducts the fatigue assessment may not have:
  - Performed or directed (on site) the work activities during which the event occurred.
  - Performed, within 24 hours before the event occurred, a fatigue assessment of the workers who were performing or directing (on site) the work activities during which the event occurred.
  - Evaluated or approved a waiver for any of the workers who were performing or directing (on site) the work activities during which the event occurred, if the event occurred while such workers were performing work under that waiver.
- For items below as appropriate, interview/observe worker and review worker's assessment/documents to determine whether additional controls and conditions are necessary to address fatigue.

Fatigue Assessment Basis: Describe observed behavior or self-declared conditions leading to assessment. Minimally state the category of duties (Ops, Maintenance, HP, Chemistry, Security, or other) the worker was performing and whether the worker was performing outage activities.

Comments:

(Continued on page 3)

Fatigue Assessment

PART B (continued)

Acute Fatigue Indicators: (Fatigue cause occurring within last 24 hours/since last 10 hour break)

1. Was sleep restricted within last 24 hours? [ ] YES [ ] NO
   Comments:
2. Has worker been awake > 16 hours? [ ] YES [ ] NO
   Comments:
3. Did tasks at or away from work require physical exertion? [ ] YES [ ] NO
   Comments:
4. Does worker appear intoxicated? [ ] YES [ ] NO
   Comments:
5. Sleepiness-yawning, tired eyes, legs? [ ] YES [ ] NO
   Comments:
6. Rubs face with hands often? [ ] YES [ ] NO
   Comments:
7. Poor communication/decisions? [ ] YES [ ] NO
   Comments:
8. Bad mood, apathetic, fixated? [ ] YES [ ] NO
   Comments:

Observe worker and review Section A completed by the worker:
Comments:

Cumulative Fatigue Indicators (Increases in fatigue over consecutive sleep-wake periods resulting from inadequate rest)

9. Was sleep restricted between any changes in shift schedules within the last 14 days? [ ] YES [ ] NO
10. Did worker experience sustained wakefulness within last 14 days (were length of sleep periods reduced as work week progressed)? [ ] YES [ ] NO
11. If worker has sleep debt, has worker been unable to catch-up depleted sleep between shifts or on off-periods? [ ] YES [ ] NO [ ] N/A
12. Has worker experienced any personal issues or other factors that may impact his or her ability to obtain adequate sleep within last month? If so, when? Describe impact. [ ] YES [ ] NO
13. Has worker lacked initiative or creativity? [ ] YES [ ] NO
14. Has worker's work schedule during past 14 days prevented opportunity to obtain sufficient rest? [ ] YES [ ] NO

Comments:

(Continued on page 4)

Fatigue Assessment

Circadian Rhythm Considerations
(changes in alertness and cognitive/motor functioning related to approximate 24-hour cycle)

Is worker on day, afternoon or evening shifts? [ ] Day Shift [ ] Afternoon Shift [ ] Evening Shift

15. Is worker experiencing or exhibiting fatigue symptoms during possible physiological alertness low points (01:00 - 04:30 or 13:30 - 15:30)? [ ] YES [ ] NO
16. Is worker's rest/sleep being interrupted by external time cues such as light and social activity? [ ] YES [ ] NO

Potential Effect of Fatigue on Work Quality (What risk significant function could be impacted during this activity, i.e., reactivity management, radioactive release, pressure boundary, containment isolation/integrity, off site power, core cooling, decay heat removal? Consider quality barriers such as post maintenance testing, independent verifications, hold points, or surveillance testing.)

Nature of Work to be Performed (What environmental conditions exist that could increase fatigue? Is task repetitive? Does task have high mental focus or attention demands? Will there be social interaction?)

Assessment Results Based on your review and the fatigue assessment, you will need to determine if the individual can work without restriction (PASS), work with restrictions (PASS RESTRICTED) or not be able to continue to work (FAIL). The decision takes into consideration answers to questions B1 through B16, the answers to these questions are counted and assist with determining the assessment result. The score guidelines listed with the outcomes are to be utilized unless the individual performing the assessment determines a more restrictive outcome is indicated.

[ ] **PASS**	Worker does not exhibit signs of impairment due to fatigue and may continue to work with no additional controls or conditions. Select this outcome if there are zero or one "YES" answer on questions B1 through B16 or all answers to questions B1 through B16 are "NO" or "N/A".
[ ] **PASS RESTRICTED**	Worker may continue working under controls and conditions identified in the next block. Select this response if there are 2 or more "YES" responses on questions B1 through B16.
[ ] FAIL	Worker is exhibiting impairment due to fatigue and must be provided a break of at least 10 hours. Select this response if there are five or more "YES" answers on questions B1 through B16.

Fatigue Controls and Conditions (to address fatigue concerns identified above)

[ ] Additional Breaks Required:

[ ] Additional Oversight/Verifications/Peer Checks required:

[ ] Additional Environmental Controls required:

Results of the fatigue assessment have been provided to the assessed worker: Worker's initials_____

If worker advises assessor they do not feel they can continue working, the assessor should notify their supervisor and enter the self-declared fatigue process outline in OM14.ID1.

Initiate a notification: [ ] Notification Number: _____

Supervisor Performing Assessment:

Waived work period begins: _____/_____
Date Time*

_____/_____/_____
Print Name Signature Date/Time*

* If this assessment is for a waiver, it shall not be performed more than 4 hours before the start of the waived work period.

Retention Instructions:
Department - Document creation of this form in a notification and forward original or a copy to the access/FFD manager

Number: NRCL181-A6

Title: Evaluate Fire Zone Operability

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform X Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: Designed for SRO candidates in a classroom setting.

References:
- ECG 18.7 – Fire Rated Assemblies
- Fire Protection Drawings 111906-21
- DCPP Operational Requirements for Doors, Drawing 515221-2

Alternate Path: Yes _____ No X

Time Critical: Yes _____ No X

Time Allotment: 15 minutes

Critical Steps: See Examinee Response - Key

Job Designation: SRO

Rev Comments Bank - NRCL161 A6

Gen KA # G2.1.25 - Ability to interpret reference materials, such as graphs, curves, tables, etc. 4.2

RON FORTIER DATE: **12/02/19**
AUTHOR

CHRIS MEHIGAN DATE: **12/03/19**
OPERATIONS REPRESENTATIVE

Directions: All actions taken by examinee should be clearly documented. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure (as applicable) and told the steps with which to begin.

Required Materials:

- ECG 18.7 – Fire Rated Assemblies
- eSOMS printout
- Fire Protection Drawings 111906-21
- DCPP Operational Requirements for Doors, Drawing 515221-2

Initial Conditions: GIVEN:

- Unit 1 and Unit 2 are both at 100% power
- Maintenance has just reported that the closing mechanism on Door 326 (Battery Room 115' Elevation) on Unit 1 has failed and the door cannot be closed automatically or manually.

Initiating Cue: The Shift Manager has directed you to determine the required course of action. Document your results and the basis of your decision in the space below before reporting out.

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

Task Standard: **DO NOT READ TASK STANDARD TO EXAMINEE**

- **Determined ECG 18.7, Condition A.1 "Establish a continuous fire watch on at least one side of the inoperable assembly within 1 hour" is the only applicable TS/ECG action.**
- **Basis – with inoperable detectors in the area, only action is a continuous fire watch.**
  - NOTE: Use of an hourly fire watch patrol is not permitted due to the non-functional fire detection equipment within the same fire zone as the non-functional door.

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

Follow-up Question Documentation:

Question: _____

_____

_____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

_____

_____

_____

EXAMINEE RESPONSE - Key
• **Required Action:** Establish a continuous fire watch on at least one side of the inoperable assembly within 1 hour. • **Basis:** Use of an hourly fire watch patrol is not permitted due to the non-functional fire detection equipment within the same fire zone as the non-functional door.

Initial Conditions: GIVEN:

- Unit 1 and Unit 2 are both at 100% power

  Maintenance has just reported that the closing mechanism on Door 326 (Battery Room 115' Elevation) on Unit 1 has failed and the door cannot be closed automatically or manually.

Initiating Cue: The Shift Manager has directed you to determine the required course of action. Document your results and the basis of your decision in the space below before reporting out.

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

EXAMINEE RESPONSE
ACTION: BASIS:

SUPPRESSION SYSTEMS

- WET PIPE SPRINKLER
- WATER SPRAY (DELUGE)
- SEMI-AUTO WATER SPRAY
- PRE-ACTION SPRINKLERS
- MANUAL WATER SPRAY
- CO_2
- HALON 1301
- NO COMBUSTIBLE STORAGE
- FIRE DETECTOR ZONES (COLOR & DIRECTION FOR REFERENCE ONLY)

SMOKE REMOVAL

- P — PRESSURIZATION AIR FLOW PATH
- R — SMOKE REMOVAL AIR FLOW PATH
- PORTABLE FAN
- HVAC — HVAC CONTROLS

EXTINGUISHANTS

- FIRE HOSE STATION
- SFHS — SEISMIC FIRE HOSE STATION
- HA=HALON
DC=DRY CHEMICAL
H_2O=WATER
CO_2=CARBON DIOXIDE
- WDC=WHEELED DRY CHEMICAL
WCO_2=CARBON DIOXIDE
- FIRE HYDRANT
- S — SEISMIC STANDPIPE
- NS — NON-SEISMIC STANDPIPE
- NSPC EQUIPMENT

COMMUNICATION

- TELEPHONE
- SOUND POWERED PHONE
- RESTRICTED RADIO TRANSMISSION

ELECTRICAL

- ELECTRICAL SHUTOFF
- 110 VAC ELECTRICAL OUTLET
- 125 VAC ELECTRICAL OUTLET
- EP — ELECTRICAL PANEL
- EMBEDDED CONDUIT
- E — EMERGENCY LIGHTING

SPECIAL HAZARDS

- FLSC — FLAMMABLE LIQUID STORAGE CABINET
- HYDROGEN PIPING
- GAS — GAS CYLINDER
- RADIOLOGICAL HAZARD
- HAZARDOUS MATERIAL

OTHER

- DETECTOR HATCH
- POST INDICATOR VALVE
- I — ISOLATION VALVE
- FDC — FIRE DEPARTMENT CONNECTION
- AP — FIRE ALARM PANEL
- H — HEAT DETECTOR
- SMOKE DETECTOR
- A — MANUAL ACTUATION VALVE
- D — DELUGE ISOLATION VALVE
- P — PULL STATION
- STOKES BASKET
- M — MSA SCBA PACK
- AED — AUTOMATED EXTERNAL DEFIBULATOR
- SC — SERVICE WATER SHUTOFF
- KB — KNOX BOX
- FD — FLOOR DRAIN
- C — CARDOX PULL STATION
- UNDERGROUND ISO VALVE
- EW/S — EYE WASH AND SHOWER
- EW — EYE WASH
- HRK — HAZMAT RESPONSE KIT
- KEY LOCKED DOOR
- E- — EXHAUST FAN
- S- — SUPPLY FAN
- W — DOMESTIC WATER SHUTOFF
- HRA — RADIATION LEVEL > 100 MREM/HR AT 30 CM FROM THE RADIATION SOURCE.
- HHRA — RADIATION LEVEL > 1000 MREM/HR AT 30 CM FROM THE RADIATION SOURCE.
- VHRA — DOSE > 500 RADS IN ONE HOUR AT ONE METER FROM THE RADIATION SOURCE.
- SCA — SURFACE CONTAMINATION AREA

SYMBOLS

UNIT 1 & 2

DIABLO CANYON POWER PLANT - PG&E CO.

FIRE PROTECTION

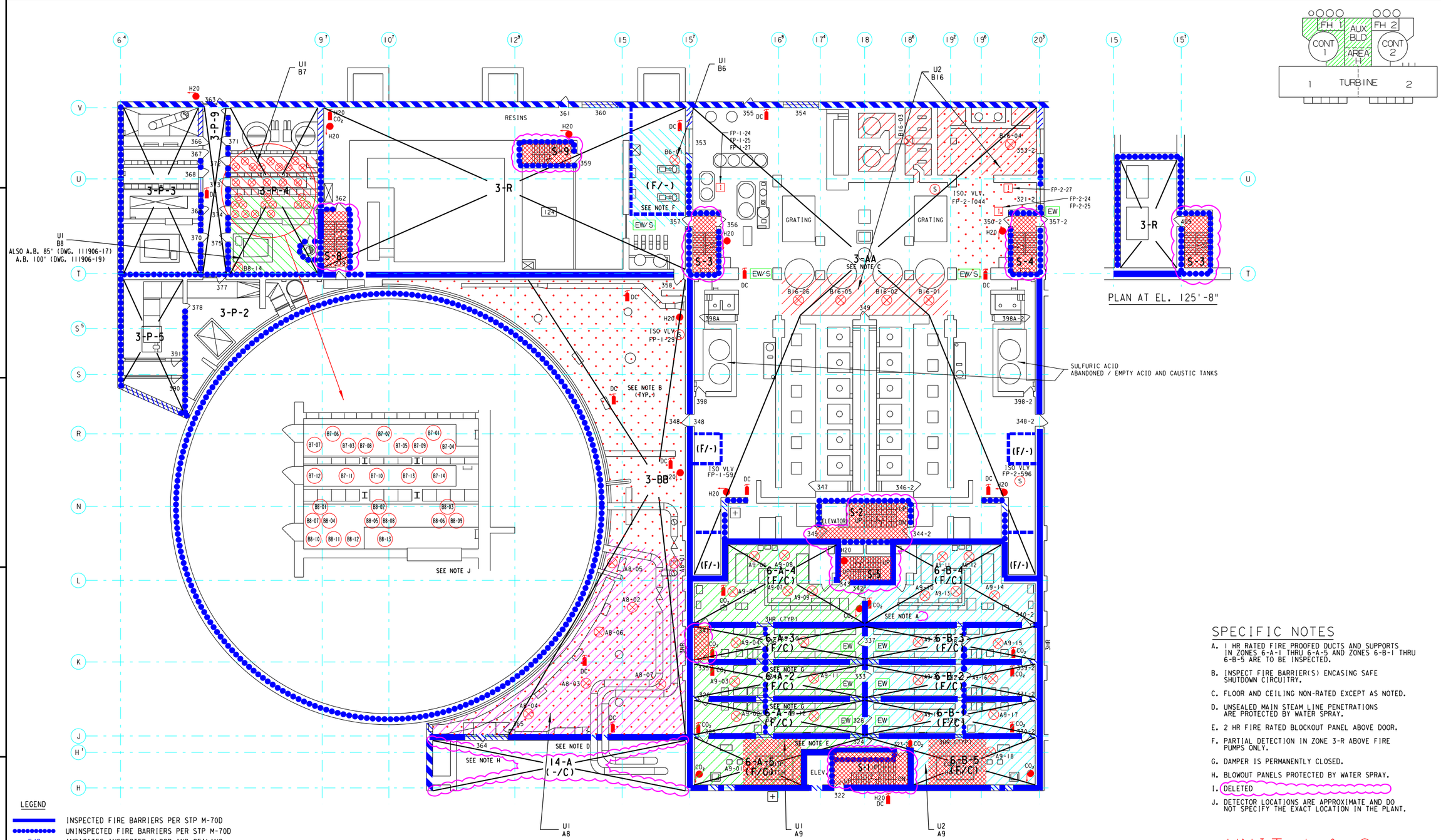
Preliminary

DRAWING	SHEET	PAGE	REV
111906	2	0	6

DATE	DWN	RE	IV	PROFESSIONAL ENGINEER	PE DISC.	PE#	PE EXP.	
11-08-2018	ZNS4	FXC2		NOT REQUIRED PER CF3.ID5	-	-	-	Revised Per DDN-2*1788

TNPG2ND
1 Size

RASTER=111906-2-0.dgn
DGN=111906-2-0.dgn
CAD User:ZNS4 Date:05-29-2018



SPECIFIC NOTES

A. 1 HR RATED FIRE PROOFED DUCTS AND SUPPORTS IN ZONES 6-A-1 THRU 6-A-5 AND ZONES 6-B-1 THRU 6-B-5 ARE TO BE INSPECTED.

B. INSPECT FIRE BARRIER(S) ENCASING SAFE SHUTDOWN CIRCUITRY.

C. FLOOR AND CEILING NON-RATED EXCEPT AS NOTED.

D. UNSEALED MAIN STEAM LINE PENETRATIONS ARE PROTECTED BY WATER SPRAY.

E. 2 HR FIRE RATED BLOCKOUT PANEL ABOVE DOOR.

F. PARTIAL DETECTION IN ZONE 3-R ABOVE FIRE PUMPS ONLY.

G. DAMPER IS PERMANENTLY CLOSED.

H. BLOWOUT PANELS PROTECTED BY WATER SPRAY.

I. DELETED

J. DETECTOR LOCATIONS ARE APPROXIMATE AND DO NOT SPECIFY THE EXACT LOCATION IN THE PLANT.

LEGEND

- INSPECTED FIRE BARRIERS PER STP M-70D
- UNINSPECTED FIRE BARRIERS PER STP M-70D
- F/C — INDICATES INSPECTED FLOOR AND CEILING
- INDICATES LIMITS OF INSPECTION FOR FLOOR/CEILING OR PARTIAL SUPPRESSION
- INDICATES AN ACCEPTABLE DEGRADATION IN BARRIER
- NONRATED BARRIERS
- INSPECTED HELB BARRIER PER STP M-70D

AUXILIARY BUILDING ELEV. 115'

NORTH

UNIT 1 & 2

DIABLO CANYON POWER PLANT - PG&E CO.

FIRE PROTECTION

DRAWING	SHEET	PAGE	REV
111906	21	0	13

DATE	DWN	RE	IV	PROFESSIONAL ENGINEER	PE DISC.	PE#	PE EXP.	
05-22-2018	ZNS4	FXC2		NOT REQUIRED PER CF3.ID5	-	-	-	Revised Per DDN-2*1788

INPG2ND
I Size

RASTER=111906-21-0.dgn
DGN=111906-21-0.dgn
CAD User: ZNS4 Date: 05-22-2018

515221 2

DOOR SCHEDULE - UNIT #1

BUILDING	AREA	DOOR No. ● SEE DWG. 515227	DESIGN CLASS SEE NOTE 8.0	QUALIFICATION SEE NOTE 4.0	MAINT. RULE SCOPE	REQUIRED DOOR POSITION	FIRE PROTECTION FIRE DOORS (SEE NOTE 1.0) RATING	FIRE PROTECTION FIRE DOORS (SEE NOTE 1.0) ECG	HVAC DOORS HVAC DESIGN FUNCTION ●	HVAC DOORS HVAC SYSTEM	HVAC DOORS TECH.SPEC. OR ECG	HELB DOORS (SEE NOTE 3.0) YES	HELB DOORS (SEE NOTE 3.0) ECG	HELB DOORS (SEE NOTE 3.0) OPERATIONAL MODE APPLICABILITY	FLOOD DOORS (SEE NOTE 7.0) YES	FLOOD DOORS (SEE NOTE 7.0) ECG	FLOOD DOORS (SEE NOTE 7.0) OPERATIONAL MODE APPLICABILITY	* REMARKS
CNF. PNTN.	GE	189	II	-	-	CLOSE	-	-	-	-	-							
	GE	189A	II	G	Y	CLOSE	A	18.7	-	-	-	Y*	80.1	1,2,3,4 **	Y	80.1	1,2,3 **	* SEE NOTE 3.0(2) ** UNIT 1 ONLY
VENT. BLDG.	L	190	II	G	-	CLOSE	A	-	-	-	-							
	L	190A		-	-	_	-	-	-	-	-							
	L	191 ●		-	-	_	-	-	-	-	-							
CNF. PNTN.	GW	192 ●		-	-	_	-	-	-	-	-							
	GW	192A ●		-	-	_	-	-	-	-	-							
T.B.	D	193	II	G	Y	CLOSE	A	18.7	-	-	-							
VENT. BLDG.	L	194 ●	II	G	-	CLOSE	Z	-	-	-	-							
	L	198	II	G	-	CLOSE	Z	-	-	-	-							
	L	199																DOOR AND FRAME REMOVED
PPWAY	FW	199A ●		-	-	-	-	-	-	-	-							
T.B.	A	199B	II	G	Y	CLOSE	A	18.7	-	-	-							
	A	199C	II	G	Y	CLOSE	A	18.7	-	-	-							
AUX.	H	199D	II	G	Y	CLOSE	A	18.7	-	-	-							
TURBINE BUILDING	A	201	II	G	-	CLOSE	B	-										
	A	202	II	G	-	CLOSE	B	-	-	-	-							
	A	203	II	G	Y	CLOSE	B	18.7	-	-	-							
	A	204	II	G	-	CLOSE	B	-	-	-	-							
	A	205	II	G	Y	CLOSE	B	18.7	-	-	-							
	A	206	II	G	-	CLOSE	B	-	-	-	-							
	A	207	II	G	Y	CLOSE	B	18.7	-	-	-	Y	80.1	1,2,3 *				* EITHER UNIT
	A	208	II	G	Y	CLOSE	B	18.7	-	-	-	Y	80.1	1,2,3 *				* EITHER UNIT
	A	209	II	G	Y	CLOSE	B	18.7	-	-	-							
	A	209A	II	G	Y	CLOSE	A	18.7	COOLING	DG VENT	80.1, 23.1							
	A	209B	II	G	Y	CLOSE	A	18.7	COOLING	DG VENT	80.1, 23.1							
	A	210	II	G*	Y	CLOSE	B	18.7			-	Y	80.1	1,2,3 *				* SEE NOTE 9.0,11.0,12.0, ** EITHER UNIT
	A	211 ●	II	G	Y	CLOSE	A	18.7	-	-	-	Y	80.1	1,2,3 *				* EITHER UNIT
	A	211A	II	G	Y	CLOSE	A	18.7	COOLING	DG VENT	80.1, 23.1							
	B	212 ●	II	G	Y	CLOSE	A	18.7	_	_	_	Y	80.1	1,2,3 *				* EITHER UNIT
	B	213 ●	II	G	Y	CLOSE	A	-	_	_	_	Y	80.1	1,2,3 *				* EITHER UNIT
	D	214	II	G	Y	CLOSE	A	18.7	_	_	_							
	D	215	II	G	Y	CLOSE	A	18.7	_	_	_							
	D	216	II	G	Y	OPEN	A	-	_	_	_	Y*	80.1	1,2,3 **				* VENT PATH, MUST BE KEPT OPEN ** EITHER UNIT
	D	217	II	G	Y	OPEN	A	-				Y*	80.1	1,2,3 **				* VENT PATH, MUST BE KEPT OPEN ** EITHER UNIT
AUXILIARY BUILDING	H	221	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	223	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	224	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	225	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	226	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	227	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	228	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	229	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	230	II	G	Y	CLOSE	A	18.7	-	-	-							
	H	231	II	G	Y	CLOSE	B	18.7	-	-	-							
	H	232	II	G	Y	CLOSE	A	18.7	-	-	-							
	H	233		-	-	-	-	-	-	-	-							
	K	242	II	G	Y	CLOSE	B	-	-	-	-							SEE NOTE 12.0
	K	244		-	-	-	-	-	-	-	-							
	K	245	II	G	Y	CLOSE	B	18.7	-	-	-	Y*	80.1	1,2,3,4	Y	80.1	1,2,3 **	* SEE NOTE 3.0(2) EITHER UNIT ** UNIT 1 ONLY, SEE NOTE 12.0
	K	247		-	-	-	-	-	-	-	-							
	K	253		-	-	-	-	-	-	-	-							
	K	253A		-	-	-	-	-	-	-	-							
	K	253B		-	-	-	-	-	-	-	-							
	K	253C		-	-	-	-	-	-	-	-							
	K	254		-	-	-	-	-	-	-	-							
	K	255		-	Y	CLOSE	-	-	-	-	-	Y*	80.1	1,2,3,4 **				* SEE NOTE 3.0(3) ** EITHER UNIT
	K	256		-	-	CLOSE	-	-	-	-	-							
	K	257	II	G	-	CLOSE	A	-			-							
	K	258	II	G	Y	CLOSE	A	18.7	BLDG PRESS/ RAD CONTROL	FHBVS	80.1, 3.7.13	Y	80.1	1,2,3,4 *	Y	80.1	1,2,3,4 **	* EITHER UNIT ** UNIT 1 ONLY; SEE PIMS FOR DOOR GAP REQ'TS., SEE NOTE 12.0
FUEL HAND.	J	259	II	G	Y	CLOSE	B	18.7	-	-	-	Y	80.1	1,2,3,4 *				* UNIT 1 ONLY
	J	259A		-	-	-	-	-	-	-	-							
	J	259B		-	Y	-	-	-	-	-	-	Y	80.1	1,2,3,4 *				* EITHER UNIT SEE NOTE 3.0 (3)
CNT. PNTN.	GW	260		-	Y	CLOSE	-	-	BLDG PRESS	POST LOCA HVAC	80.1, 11.1							
	GW	260A		-	Y	CLOSE	-	-	BLDG PRESS	POST LOCA HVAC	80.1, 11.1							
	GE	260B				CLOSE												
FUEL HAND.	J	261		-	Y	-	-	-	-	-	-	Y	80.1	1,2,3,4 *				* EITHER UNIT SEE NOTE 3.0 (3)
	J	262	II	G	Y	CLOSE	A	18.7	-	-	-	Y	80.1	1,2,3,4 *				* UNIT 1 ONLY
	J	263	II	G	Y	CLOSE	A	18.7	BLDG PRESS/ RAD CONTROL	FHBVS	80.1, 3.7.13	Y	80.1	1,2,3,4 *				* EITHER UNIT
VENT	L	264	II	G	Y	CLOSE	Z	-	BLDG PRESS/ RAD CONTROL	FHBVS	80.1, 3.7.13	Y	80.1	1,2,3,4 *				* EITHER UNIT
FUEL HL	J	265	II	G	Y	CLOSE	B	18.7	BLDG PRESS/ RAD CONTROL	FHBVS	80.1, 3.7.13	Y*	80.1	1,2,3,4 **	Y	80.1	1,2,3, **	* SEE NOTE 3.0(2) ** UNIT 1 ONLY
VENT. BLDG.	L	266	I	Q	Y	CLOSE	Z	-	SYS PRESS BNDRY/COOLING	ABVS	80.1, 3.7.12, 23.1							SEE NOTE 9.0
	L	267	I	Q	Y	CLOSE	Z	-	SYS PRESS BNDRY/COOLING	ABVS	80.1, 3.7.12, 23.1							SEE NOTE 9.0
	L	268	I	Q	Y	CLOSE	Z	-	SYS PRESS BNDRY/COOLING	ABVS	80.1, 3.7.12, 23.1							SEE NOTE 9.0
C.PNTN.	GW	269 ●	II	G	Y	CLOSE	A	18.7				Y*	80.1	1,2,3,4 **				* BLOWOUT DOOR @ 1.5 PSI ** UNIT 1 ONLY
VENT. BLDG.	L	270 ●		-	-	CLOSE	-	-	-	-	-							
	L	271		-	Y	CLOSE	-	-	-	-	-	Y	80.1	1,2,3,4 *				* UNIT 1 ONLY
	L	272																DOOR & FRAME REMOVED. INFILL W/CONCRETE BLOCK.
	L	273		-	-	CLOSE	-	-	-	-	-							
	L	274	I	Q	Y	CLOSE	-	-	SYS PRESS BNDRY/COOLING	ABVS	80.1, 3.7.12, 23.1							SEE NOTE 9.0

DOOR SCHEDULE - UNIT #1

BUILDING	AREA	DOOR No. ● SEE DWG. 515227	DESIGN CLASS SEE NOTE 8.0	QUALIFICATION SEE NOTE 4.0	MAINT. RULE SCOPE	REQUIRED DOOR POSITION	FIRE PROTECTION FIRE DOORS (SEE NOTE 1.0) RATING	FIRE PROTECTION FIRE DOORS (SEE NOTE 1.0) ECG	HVAC DOORS HVAC DESIGN FUNCTION ●	HVAC DOORS HVAC SYSTEM	HVAC DOORS TECH.SPEC. OR ECG	HELB DOORS (SEE NOTE 3.0) YES	HELB DOORS (SEE NOTE 3.0) ECG	HELB DOORS (SEE NOTE 3.0) OPERATIONAL MODE APPLICABILITY	FLOOD DOORS (SEE NOTE 7.0) YES	FLOOD DOORS (SEE NOTE 7.0) ECG	FLOOD DOORS (SEE NOTE 7.0) OPERATIONAL MODE APPLICABILITY	* REMARKS
CONT. STRUCT.	F	275	I	Q	Y	CLOSE	-	-	-	-	-				X	80.1 *		MODE 1 THRU 4; RHR SUMP FUNCTION
	G	277	I	Q	Y	CLOSE	-	-	-	-	-				X	80.1 *		MODE 1 THRU 4; RHR SUMP FUNCTION
	G	278	II	-	-	CLOSE	-	-	-	-	-				X	80.1 *		MODE 1 THRU 4; RHR SUMP FUNCTION
F.HND.	J	279	II	G	Y	CLOSE	A	18.7	BLDG PRESS/ RAD CONTROL	FHBVS	80.1, 3.7.13	Y	80.1	1,2,3,4 *				* UNIT 1 ONLY
AUX.	K	280		-	Y	-	-	-	-	-	-							SEE NOTE 12.0
VENT.	L	282		-	-	CLOSE	-	-	-	-	-							
CNT.	G	282A		-	-	-	-	-	-	-	-							
VENT.	L	283		-	-	CLOSE	-	-	-	-	-							
									-	-	-							
F.HND.	J	285	II	G	Y	CLOSE	B	18.7										SEE NOTE 12.0
VENT.	L	286	II	G	Y	CLOSE	A	-	-	-	-							
	L	287		-	-	-	-	-	-	-	-							
CONTAINMENT STRUCTURE	F	288		-	-	-	-	-	-	-	-							DOOR & FENCE REMOVED
	F	288A		-	-	-	-	-	-	-	-							
	F	289		-	-	_	-	-	-	-	-							
	F	290		-	-	_	-	-	_	_	_							DOOR & FENCE REMOVED
	G	291		-	-	_	-	-	_	_	_							DOOR & FENCE REMOVED
	G	292		-	-	_	-	-	_	_	_							DOOR & FENCE REMOVED
	G	293		-	-	_	-	-	_	_	_							DOOR & FENCE REMOVED
AUX.	K	294		-	Y	CLOSE	-	-	-	-	-							SEE NOTE 12.0
PPWAY	FW	296 ●		-	-	-	-	-	-	-	-							
FUEL HNDL.	J	296A		-	-	-	-	-	-	-	-							DOOR REMOVED
	J	297	II	G	Y	CLOSE	A	18.7	-	-	-	Y	80.1	1,2,3 *	Y	80.1	1,2,3,4 *	* UNIT 1 ONLY; SEE PIMS FOR GAP REQ'TS.
	J	297A	II	G	Y	CLOSE	A	18.7	-	-	-	Y	80.1	1,2,3 *	Y	80.1	1,2,3,4 *	* UNIT 1 ONLY; SEE PIMS FOR GAP REQ'TS.
TURBINE BUILDING	A	298	II	G	Y	CLOSE	A	18.7	-	-	-							
	A	298A	II	G	Y	CLOSE	A	18.7	-	-	-							
	A	298B	II	G	Y	CLOSE	A	18.7	-	-	-							
	A	298C	II	G	Y	CLOSE	A	18.7	-	-	-							
	A	300		-	-	-	-	-	-	-	-							
	A	300A		-	-	-	-	-	-	-	-							
	A	301	II	G	Y	CLOSE	B	18.7	-	-	-							
	A	301A		-	-	-	-	-	-	-	-							
	A	301B		-	-	-	-	-	-	-	-							
	A	301C		-	-	-	-	-	-	-	-							
	A	301D		-	-	-	-	-	-	-	-							
	A	301E		-	-	-	-	-	-	-	-							
	A	301F		-	-	-	-	-	-	-	-							
	A	302	II	G	Y	CLOSE	B	18.7	-	-	-							
	A	303	I	Q	Y	CLOSE	A	18.7	COOLING	4KV VENT	80.1, 23.1	Y	80.1	1,2,3 *				* EITHER UNIT
	A	304	II	G	Y	CLOSE	B	18.7	-	-	-	Y	80.1	1,2,3 *				SEE NOTE 12.0, * EITHER UNIT
	A	305 ●	I	Q	Y	CLOSE	B	18.7	COOLING	4KV VENT	80.1, 23.1							
	A	306	II	G	Y	CLOSE	B	18.7	-	-	-							
	A	307	II	G	Y	CLOSE	B	18.7	-	-	-							SEE NOTE 12.0
	A	308	II	G	Y	CLOSE	B	18.7	-	-	-							
	A	309	II	G	Y	CLOSE	B	18.7	-	-	-							SEE NOTE 12.0
	A	310	II	G	Y	CLOSE	B	18.7	-	-	-							SEE NOTE 12.0
	A	311	II	G	Y	CLOSE	B	18.7	-	-	-	Y	80.1	1,2,3 *				SEE NOTE 12.0, * EITHER UNIT
	D	312	II	G	-	CLOSE	Aeq	-	-	-	-							
	D	313	II	G	-	CLOSE	Aeq	-	-	-	-							
	D	314	II	G	-	CLOSE	A	-	-	-	-							
	E	315	II	G	Y	OPEN	A	-	-	-	-	Y*	80.1	1,2,3 **				* VENT PATH, MUST BE KEPT OPEN **EITHER UNIT
	E	316	II	G	Y	OPEN	A	-	-	-	-	Y*	80.1	1,2,3 **				* VENT PATH, MUST BE KEPT OPEN **EITHER UNIT
	E	317		-	-	-	-	-	-	-	-							
	E	317A		-	-	-	-	-	-	-	-							
	E	320																DOOR AND FRAME REMOVED
	E	321	II	G	-	CLOSE	A	-	-	-	-							
AUXILIARY BUILDING	H	322	II	G	Y	CLOSE	A	18.7	-	-	-							
	H	324	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	325	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	326	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	327	II	G	-	CLOSE	B		-	-	-							
	H	328	II	G	Y	CLOSE	A	18.7	-	-	-							
	H	333	II	G	Y	CLOSE	A	18.7	-	-	-							
	H	334	II	G	-	CLOSE	A	-	-	-	-							
	H	335	II	G	Y	CLOSE	A	18.7	-	-	-							SEE NOTE 12.0
	H	336	II	G	-	CLOSE	A	-	-	-	-							

NOTES

1.0 FIRE PROTECTION

(1) FIRE RATING IDENTIFICATION RATING OF FIRE DOORS IS AS FOLLOWS:
A = 3 HOUR FIRE RATED (NO GLASS) *
Aeq = UNLABELED DOOR BUILT TO "A" LABEL SPECS.

B = 1½ HOUR FIRE RATED
Beq = UNLABELED DOOR BUILT TO "B" LABEL SPECS.

C = ¾ HOUR FIRE RATED
Ceq = UNLABELED DOOR BUILT TO "C" LABEL SPECS.

D = ½ HOUR FIRE RATED EXTERIOR DOOR (NO GLASS) *

Z = NON RATED DOOR TO BE MAINTAINED AS DESIGNED PER SHEET 1 OF THIS DWG. UNDER THE GRADED QA PROGRAM.

(2) FIRE DOORS IDENTIFIED AS A - NRC COMMITMENT ARE INSPECTED PER STP-M70

(3) FOR ADDITIONAL INFORMATION ON RATING OF FIRE DOORS SEE FIRE PROTECTION DRAWINGS 515562 THRU 515580 AND DOCUMENT CHRON. #171502.

* THE FIRE RATING OF THE DOOR IS NOT AFFECTED BY GLASS OR NOT GLASS.

2.0 (NOT USED)

3.0 COMPARTMENT PRESSURIZATION:

(1) SEE CALC. No. N-011 FOR PRESSURE DIFFERENTIAL ACROSS THE CLOSED DOOR DUE TO HELB.

(2) SEE CALC. No. EQP 351.2 FOR QUALIFICATION OF THE CAPACITY OF PRESSURE DOORS TO MAINTAIN PRESSURE BOUNDARY BETWEEN GE/GW & AREAS H, J, K & L.

(3) WIRE/GRATING DOOR IS USED AS A VENT PATH, DO NOT ADD ANY OBSTRUCTIONS TO THIS DOOR.

4.0 QUALIFICATION OF "Q" DOORS

(1) DOORS IDENTIFIED AS "Q" IN REV. 1 OF THIS DRAWING WERE QUALIFIED PER CALC. DC1-1-AE-90, SEISMIC QUALIFICATION OF DOORS IDENTIFIED AS "Q" IN DCN-DCO-EA-47466 IS DOCUMENTED IN CALC. # EQP-714, CALC. EQP-714 QUALIFIED PARTS DESCRIBED IN NOTE 4.0, (5).

(2) DOORS 266 TO 268,274,366 TO 375, 546 TO 553,266-2 TO 268-2,274-2, 366-2 TO 375-2 AND 546-2 TO 553-2 WERE ORIGINALLY PURCHASED AND INSTALLED AS "Q" PER DCO-EA-3523. REFERENCE: MEMORANDUM FROM NES MECH. TO NES CIVIL, CHRON. NO. 150263.

(3) FOR ROLL-UP DOORS, "Q" REQUIREMENTS SHALL APPLY TO THE ENTIRE DOOR AND ITS ANCHORAGE. REPLACEMENT OF DOOR SHALL INVOLVE PROCUREMENT OF PARTS BY RPE AND QC INSPECTION ACCORDING TO APPLICABLE PLANT/CONSTRUCTION PROCEDURES ON "Q" DOORS

(4) DOORS A1,A2,A4,A5 WERE PURCHASED AS "Q" SEE AE*7 OF AR* A0254148.

(5) ONLY THE FOLLOWING COMPONENTS OF "Q" HOLLOW METAL DOORS ARE SUBJECT TO "Q" REQUIREMENTS: DOOR AND FRAME, FRAME ANCHORS, HINGES, LOCKSET /LATCHSET STRIKE PLATE, TOP AND BOTTOM BOLTS OF INACTIVE LEAF OF DOUBLE DOORS. REPLACEMENT OF DOOR SHALL INVOLVE PROCUREMENT OF PARTS BY RPE AND QC INSPECTION ACCORDING TO APPLICABLE PLANT/CONSTRUCTION PROCEDURES ON "Q" DOORS.

(6) THE FOLLOWING COMPONENTS OF "Q" HOLLOW METAL DOORS ARE NON-QUALITY "N" PARTS, ADDED ON ACCESSORIES FEATURES THAT DO NOT AFFECT THE REQUIREMENTS OF THE DOOR: DOOR STOP, WEATHER SEALS, ASTRAGAL, ANTI-PICK PLATE, KICK/PUSH PLATE, THRESHOLDS, DOOR COORDINATOR AND KNOB GUARDS. THESE COMPONENTS COMPLIMENT THE DOOR FUNCTION.

5.0 ALL OTHER COMPONENTS NOT LISTED IN NOTE 4.0, (5), (6) OF FIRE-RATED HOLLOW METAL "Q" DOORS ARE SUBJECT TO QUALITY CLASS "G" REQUIREMENTS.

6.0 SEE CALC. No. 304.1 FOR SEISMIC QUALIFICATION OF ROLL-UP DOORS WALL ANCHORAGE FOR CLASS I CRITERIA AND OF AUTOMATIC CLOSING DEVICE FOR HOSGRI,DE & DDE EVENTS. WALL MODIFIED PER DCN DC2-EC-2662 R1, REFERENCE CALC. *B28-08-09-01.

7.0 SEE CALC. No. N-032 FOR FLOOD LEVELS.

8.0 DOORS THAT ARE NOT SHOWN AS DESIGN CLASS I OR II ARE DESIGN CLASS III.

9.0 DOOR IS CONSIDERED A SISI TARGET.

10.0 ROLL UP DOOR IS SISI ANALYSED TO REMAIN IN THE OPEN POSITION FOLLOWING A SEISMIC EVENT. THE FUSIBLE LINK IS SPECIFICALLY EVALUATED NOT TO BREAK DURING A SEISMIC EVENT WHICH MAY CAUSE THE DOOR CURTAIN TO DROP AND BLOCK THE OPENING.

11.0 DESIGN CLASS II DOORS WITH SPECIAL SEISMIC QUALIFICATION REQUIREMENTS

DOORS ARE REQUIRED TO BE SEISMICALLY QUALIFIED TO ASSURE DOORS REMAIN INTACT AND IN THEIR CLOSED POSITION DURING AND AFTER A SEISMIC EVENT AS DEFINED IN THE "Q" LIST TO MEET VENTILATION REQUIREMENTS FOR THE DIESEL GENERATOR ROOMS. THESE DOORS ARE QUALIFIED PER CALC. *EQP-714 AND *38T-20 (DOOR 115 ONLY). REPLACEMENT OF THESE DOORS SHALL BE SUBJECT TO THE FOLLOWING SPECIAL QUALITY REQUIREMENTS:

(1) ROLL-UP DOORS SHALL BE SUBJECT TO THE SAME REQUIREMENTS AS INDICATED FOR "Q" DOORS ON NOTE 4.0 (3) OF THIS DRAWING

(2) HOLLOW-METAL DOORS SHALL BE SUBJECT TO THE SAME REQUIREMENTS INDICATED FOR "Q" DOORS ON NOTE 4.0 (5) OF THIS DRAWING.

12.0 DOORS THAT MUST BE PASSABLE BY OPERATORS TO SUPPORT ACTIONS TO MITIGATE THE EFFECTS OF A FIRE. (REF. CALCULATION 335-DC)

UNIT 1

DATE		REVISION DESCRIPTION
11-14-2019		Revised Per DFT-T*5020
D.D.	MNRU	
R.E.	FXC2	
I.V.	N/A	
P.E.	N/A	

ARCHITECTURAL
DOOR SCHEDULE
OPERATIONAL REQUIREMENTS FOR DOORS WITH FUNCTIONS IMPORTANT TO SAFETY

DIABLO CANYON POWER PLANT
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

DWG SCALE:	
BILL OF MATL:	
SUPSDS:	
SUPSD BY:	

DRAWING	SHEET	PAGE	REV
515221	2	0	29

DRAWING NUMBER 515221 2

RASTER:515221-2-0.dgn
DGN:515221-2-0.dgn
CAD User:MNRU Date:11-14-2019

DATE 5 Size

PACIFIC GAS AND ELECTRIC COMPANY
DIABLO CANYON POWER PLANT

TECH SPEC SUMMARY REPORT

UNIT 1

ACTIVE TECH SPEC & ECG LCO'S

SECTION NO.	DESCRIPTION	INOP DATE	DUE DATE	FIRE ZONE	TLS

None

ACTIVE RISK

SECTION NO.	DESCRIPTION	INOP DATE	TLS

None

ACTIVE TECH SPEC & ECG LCO'S WITH ACTION MET

SECTION NO.	DESCRIPTION	INOP DATE	ACTIONS MET	FIRE ZONE	TLS
ECG Action					
0-TS-19-0104	**Fire Damper: 1-FD-36 failed STP M-39B. STP M-39B**				
18.5.1	A.1 Establish a continuous fire watch with backup fire suppression equipment in the affected areas.	Jul 18, 2019 13:50	Jul 18, 2019 14:50	A1 Cable Spreading Room	NONE
18.5.1	B.1 Establish a fire watch patrol in the affected areas.	Jun 03, 2019 10:51	Jun 03, 2019 11:51	A1 Cable Spreading Room	NONE
18.5.1	D.1 Verify backup fire suppression equipment is available in the affected area.	Jun 03, 2019 10:51	Jun 03, 2019 11:51	A1 Cable Spreading Room	NONE
18.7	A.1 Establish a continuous fire watch on at least one side of the inoperable assembly.	Jul 18, 2019 13:50	Jul 18, 2019 14:50	A1 Cable Spreading Room	NONE
18.7	A.2.1 Verify the OPERABILITY of fire detection or an automatic fire suppression system on at least one side of	Jun 03, 2019 04:55	Jun 03, 2019 05:55	A1 Cable Spreading Room	NONE
18.7	A.2.2 Establish an hourly fire watch patrol.	Jun 03, 2019 04:55	Jun 03, 2019 05:55	A1 Cable Spreading Room	NONE
23.6	C.1.1 Restore both trains to service.	Jun 03, 2019 15:10	Jun 03, 2019 23:10	A1 Cable Spreading Room	NONE
23.6	C.1.2 Verify the area ambient temperature = 101 °F.	Jun 03, 2019 15:10	Jun 03, 2019 16:10	A1 Cable Spreading Room	NONE
1-TS-19-0550	**Fire Damper FD-43, 44, 45 4kV switchgear area**				
18.7	A.2.1 Verify the OPERABILITY of fire detection or an automatic fire suppression system on at least one side of	Jul 25, 2019 14:20	Jul 25, 2019 15:20	A3 4kV Switchgear	NONE
18.7	A.2.2 Establish an hourly fire watch patrol.	Jul 25, 2019 14:20	Jul 25, 2019 15:20	A3 4kV Switchgear	NONE

TECH SPEC SUMMARY REPORT

UNIT 1

ACTIVE TECH SPEC & ECG LCO'S WITH ACTION MET

SECTION NO.	DESCRIPTION	INOP DATE	ACTIONS MET	FIRE ZONE	TLS
ECG Action					
2-TS-19-0629	**2R21 480V switchgear ventilation maintenance (HELB/fire barriers)**				
18.7	A.1 Establish a continuous fire watch on at least one side of the inoperable assembly.	Sep 30, 2019 03:00	Sep 30, 2019 04:00	See Instructions for multi zone	2FANS45
18.7	A.2.1 Verify the OPERABILITY of fire detection or an automatic fire suppression system on at least one side of	Nov 05, 2019 10:30	Nov 05, 2019 11:30	See Instructions for multi zone	2FANS45
18.7	A.2.2 Establish an hourly fire watch patrol.	Nov 05, 2019 10:30	Nov 05, 2019 11:30	See Instructions for multi zone	2FANS45
1-TS-19-0688	**Unit 1 Risk Tracking for Unit 2 Outage (2R21 Impacts)**				
PRA	A.1 Check Safety Monitor/Phoenix	Sep 22, 2019 04:24	Sep 22, 2019 04:24	NA	1O2R21

INOPERABLE TECH SPEC or ECG EQUIPMENT (LCO'S not required to be entered)

SECTION NO.	DESCRIPTION	INOP DATE	FIRE ZONE	TLS
TECH SPEC				
1-TS-08-0038	**INCORE THERMOCOUPLES - TRAIN A: TT-17 (III), TT-21 (II), TT-49 (IV), TT-61 (III) / TRAIN B: TT-16 (IV), TT-25 (II), TT-28 (III)**			
3.3.3	A.1 Restore required channel to OPERABLE status.	Sep 27, 2008 10:07	NA	None
1-TS-19-0821	**Intermediate Range Channnel, NI-35 loss of voltage**			
3.3.1	A.1 Enter the Condition referenced in Table 3.3.1 1 for the channel(s) or trains.	Nov 25, 2019 07:46	NA	NONE
3.3.1	F.1 Reduce THERMAL POWER to < P-6.	Nov 25, 2019 07:46	NA	NONE
3.3.1	F.2 Increase THERMAL POWER to > P-10.	Nov 25, 2019 07:46	NA	NONE
3.3.1	G.1 ----------NOTE---------- Limited boron concentration changes associated with RCS inventory control or limited	Nov 25, 2019 07:46	NA	NONE
3.3.1	G.2 Reduce THERMAL POWER to < P-6.	Nov 25, 2019 07:46	NA	NONE
3.3.1	S.1 Verify interlock is in required state for existing unit conditions.	Nov 25, 2019 07:46	NA	NONE
3.3.1	S.2 Be in MODE 3.	Nov 25, 2019 07:46	NA	NONE
ECG Action				

UNIT 1

TECH SPEC SUMMARY REPORT

INOPERABLE TECH SPEC or ECG EQUIPMENT (LCO'S not required to be entered)

SECTION NO.	DESCRIPTION	INOP DATE	FIRE ZONE	TLS
ECG Action				
0-TS-19-0104	**Fire Damper: 1-FD-36 failed STP M-39B. STP M-39B**			
18.5.1	A-2 Implement alternate compensatory measure(s).	Jun 03, 2019 17:22	A1 Cable Spreading Room	NONE
18.7	A.1 Establish a continuous fire watch on at least one side of the inoperable assembly.	Jun 03, 2019 17:22	A1 Cable Spreading Room	NONE
18.7	A.2.1 Verify the OPERABILITY of fire detection or an automatic fire suppression system on at least one side of	Jun 03, 2019 17:22	A1 Cable Spreading Room	NONE
18.7	A.2.2 Establish an hourly fire watch patrol.	Jun 03, 2019 17:22	A1 Cable Spreading Room	NONE
18.7	A.3 Implement alternate compensatory measure(s).	Jun 03, 2019 17:22	A1 Cable Spreading Room	NONE
1-TS-19-0549	**Smoke Detectors EFD09-02 and EFD09-03 Inop (Fire Zone A-9)**			
18.3	C.1 Establish hourly fire watch patrol to inspect the zone(s) with the inoperable instruments	Jul 09, 2019 08:20	A9 Reactor Trip Bkr	NONE
1-TS-19-0550	**Fire Damper FD-43, 44, 45 4kV switchgear area**			
18.7	A.1 Establish a continuous fire watch on at least one side of the inoperable assembly.	Jul 25, 2019 10:45	A3 4kV Switchgear	NONE
18.7	A.2.1 Verify the OPERABILITY of fire detection or an automatic fire suppression system on at least one side of	Jul 25, 2019 10:45	A3 4kV Switchgear	NONE
18.7	A.2.2 Establish an hourly fire watch patrol.	Jul 25, 2019 10:45	A3 4kV Switchgear	NONE
18.7	A.3 Implement alternate compensatory measure(s).	Jul 25, 2019 10:45	A3 4kV Switchgear	NONE

UNIT 1

TECH SPEC SUMMARY REPORT

INOPERABLE TECH SPEC or ECG EQUIPMENT (LCO'S not required to be entered)

SECTION NO.	DESCRIPTION	INOP DATE	FIRE ZONE	TLS
ECG Action				
2-TS-19-0629	**2R21 480V switchgear ventilation maintenance (HELB/fire barriers)**			
18.7	A.1 Establish a continuous fire watch on at least one side of the inoperable assembly.	Sep 30, 2019 03:00	See Instructions for multi zone	2FANS45
18.7	A.2.1 Verify the OPERABILITY of fire detection or an automatic fire suppression system on at least one side of	Sep 30, 2019 03:00	See Instructions for multi zone	2FANS45
18.7	A.2.2 Establish an hourly fire watch patrol.	Sep 30, 2019 03:00	See Instructions for multi zone	2FANS45
18.7	A.3 Implement alternate compensatory measure(s).	Sep 30, 2019 03:00	See Instructions for multi zone	2FANS45

18.0 Fire Protection

18.7 Fire Rated Assemblies

ECG 18.7 FIRE RATED ASSEMBLIES: All fire rated assemblies required to protect Safe Shutdown (SSD) Equipment required to maintain the fuel in a safe and stable condition shall be OPERABLE.

APPLICABILITY: Whenever SSD equipment protected by the fire rated assembly is required to be OPERABLE.

ACTIONS

----------NOTE----------
Separate Condition entry is allowed for each fire rated assembly.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more fire rated assemblies inoperable.	A.1 Establish a continuous fire watch on at least one side of the inoperable assembly. OR	1 hour
	A.2.1 Verify the OPERABILITY of fire detection or an automatic fire suppression system on at least one side of the inoperable fire rated assembly. AND	1 hour
	A.2.2 Establish an hourly fire watch patrol. OR	1 hour AND Once per hour thereafter
	A.3 Implement alternate compensatory measures(s).	1 hour

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 18.7.1	Visually inspect each of the fire rated assemblies, except penetration seals, to verify functionality.	18 months or 24 months for assemblies inside containment or inaccessible during power operation*
SR 18.7.2	Fire rated penetration seals shall be verified to be operable by performing a visual inspection of at least 10 percent of each type of penetration seal, on average.	18 months
SR 18.7.3	Verify fire rated assemblies to be functional following repairs or maintenance by the performance of a visual inspection of the affected fire rated assemblies.	Prior to returning to functional status.

* Inacessible assemblies at power include dampers 1-FD-4, 1-FD-5, 1-FD-6, 1-SD-26, 1-SD-27, 1-FD-26, 1-FD-27, 2-SD-26, 2-SD-27, 2-FD-26 and 2-FD-27.

BASES

BACKGROUND

Fire rated assemblies include all walls, floor/ceilings, fire rated enclosures, fire doors, fire dampers, hatches and penetration seals (outside containment) which are used to protect Safe Shutdown equipment required to maintain the fuel in a safe and stable condition. The following **GENERAL BASES** applies to all types of fire rated assemblies:

Implementation of the DCPP Fire Protection Program (FPP) is a condition in the Operating Licenses, paragraph 2.C.(5).a. for Unit 1 and 2.C.(4).a. for Unit 2, which reads "PG&E shall implement and maintain all provisions of the approved fire protection program that comply with 10 CFR 50.48(a) and 10 CFR 50.48(c), as specified in PG&E amendment request dated June 26, 2013 as supplemented by letters dated October 3, 2013, September 29, 2014, October 27, 2014, October 29, 2014, November 26, 2014, and December 31, 2014; February 25, 2015 (two letters), May 7, 2015, October 15, 2015, and December 31, 2015; and January 28, 2016, and as approved in the safety evaluation dated April 14, 2016.

The FPP is designed to provide assurance through a defense-in-depth approach that those structures, systems and components important to maintaining the fuel in a safe and stable condition are protected against the effects of a fire. The defense-in-depth philosophy involves preventing fires from starting, rapidly detecting fires that do occur, extinguishing fires effectively before significant damage occurs, and maintaining features, which minimize the consequences of a fire.

Safe shutdown systems have been evaluated to determine the effects of a postulated design basis fire to provide assurance that a fire will not prevent the plant from achieving and maintaining the fuel in a safe and stable condition for each fire area. The Nuclear Safety Capability Assessment credits fire rated assemblies for adequate separation of safe shutdown systems to mitigate potential consequences of a fire as required by the NFPA 805 fire protection program (Reference 3). Therefore, in the event that a fire rated assembly required for adequate separation of redundant safe shutdown systems becomes INOPERABLE, appropriate compensatory measures must be taken while the assembly is being restored to operability. Typically, compensatory measures, such as fire watches, fire detection or automatic fire suppression are used.

OPERABILITY for Fire Rated Assemblies is as defined in the DCPP Technical Specifications (TS).

(continued)

BASES

BACKGROUND (continued)

Surveillance Requirements provide assurance that the minimum operability requirements for DCPP fire rated assemblies are maintained. The NRC, in the original fire protection technical specifications, established the frequency of system surveillance's when the plant was licensed.

FIRE RATED ASSEMBLIES

The bases for maintaining Fire Rated Assemblies in an OPERABLE condition is provided in the above GENERAL BASES, along with the following:

The functional integrity of the fire rated assemblies, including penetration seals, ensures that a fire will be confined to its area of origin. This will ensure flames and hot gasses are prevented from spreading to adjacent fire areas/zones or from affecting redundant safe shutdown circuits. These design features minimize the possibility of a single fire rapidly involving several fire areas/zones of the facility prior to detection and extinguishment.

The fire rated assemblies, including walls, floors/ceilings, fire rated enclosures, penetration seals, fire doors, fire dampers, and hatches are considered functional when the observed condition is the same as the as-designed configuration. For those fire rated assemblies that are not in the as-designed configuration, either the appropriate ECG action shall be performed, until the fire rated assembly is returned to the as-designed configuration, or an evaluation should be performed. The evaluation should demonstrate that the as-found configuration has not degraded the capability of the fire rated assembly to prevent the spread of fire from the area of origin and, therefore; does not impact the ability to maintain the fuel in a safe and stable condition.

The controls provided by ECG 18.7 are based upon maintaining the passive design features as evaluated and accepted by the NRC. The action statements are based upon temporary compensatory measures for degraded barrier features. Removal of a barrier or excessive degradations of a barrier must be evaluated for additional compensatory measures.

(continued)

BASES

BACKGROUND (continued)

The Unit 1 and 2 credited Fire Rated Assemblies are shown on the 111906 series Fire Protection Drawings. Additional Fire Rated Assembly information (describing the system and its functionality) is available in Design Criteria Memorandum S-18, "Fire Protection System", S-98, "Penetration Seals", STP M-70A, "Inspection of Fire Barrier and HELB Penetration Seals", and STP M-70D, "Inspection of Rated Fire Assemblies, Except Penetration Seals, Dampers, & Doors." Fire Rated Assemblies are also categorized as ECG 18.7 in the associated FLOC. Additionally, fire doors are listed by ECG applicability in Table 18.7-1.

SYSTEM/SAFETY FUNCTION

The safety function of fire rated assemblies is to provide a passive means to ensure that a fire is confined to the area of origin.

System Description:

FIRE RATED WALLS, FLOORS, CEILINGS

The plant design and layout plays a significant role in the fire protection program by providing physical separation between redundant safe shutdown systems. Generally, when physical separation (via distance) cannot be achieved, fire barriers (i.e., walls, floors, ceilings, 3M wrap, enclosures, etc.) are provided to ensure protection of a single safety division from fire hazards, and to separate redundant divisions or trains from each other so that both are not subject to damage from a single fire. Fire Barriers are generally comprised of heat resistant and noncombustible materials such as; concrete, concrete blocks, plaster, pyrocrete, and gypsum wallboard.

FIRE RATED ENCLOSURES

Fire rated enclosures are used in conjunction with other defense-in-depth aspects to provide protection to PG&E Design Class I equipment from fire hazards and to prevent the propagation of fire. Fire Rated enclosures are generally constructed of heat resistant and non-combustible materials such as; 3M wrap, pyrocrete, and plaster.

(continued)

BASES

BACKGROUND

FIRE DOORS

Fire doors are provided to ensure a fire is confined to its area of origin. This is accomplished by having the fire rating of the fire door at least equal to the fire hazard present on either side of the barrier or equal to the fire rating of the barrier. Fire doors are equipped with automatic door closing mechanisms and have signs on them to inform plant personnel that they are fire doors and that these doors must be kept closed at all times (except for normal entry or exit). In addition, firewater suppression sprinklers are credited to protect certain fire doors. As such, the associated sprinklers must be in-service for the door to be OPERABLE. Directional closed head automatic sprinkler protection is provided on one or both sides of fifteen (15) fire doors.

Door #	Location	Associated sprinkler Isolation Valve
DOORB17	RHR pump room	FP-1-1294
DOORB18	RHR pump room	FP-1-1294
DOORB21	Charging pump room	FP-1-1294
DOORB23	Charging pump room	FP-1-1294
DOORB24	Charging pump room	FP-1-1294
DOORB42-2	RHR pump room	FP-2-1294
DOORB43-2	RHR pump room	FP-2-1294
DOORB37-2	Charging pump room	FP-2-1294
DOORB38-2	Charging pump room	FP-2-1294
DOORB39-2	Charging pump room	FP-2-1294
DOOR503	Main control room	FP-1-341
DOOR508	Main control room	FP-1-1042
DOOR560	Main control room	FP-1-1042
DOOR364	115' penetration area	FP-1-335
DOOR364-2	115' penetration area	FP-2-30

Approved fire doors, like fire barriers, are usually rated by U.L. or other recognized testing agencies. PG&E Architectural Door Schedule, Sheet 2 of drawings 515220 through 515226 and the functional location (FLOC) lists the doors at DCPP and provides information concerning door location, type, size, fire rating, hardware, and ECG applicability. Fire doors controlled by this ECG are listed in Table 18.7-1.

(continued)

Table 18.7-1
Fire Doors Controlled by ECG 18.7

Unit	Door	Building	Elevation
1	A1	INTAKE	-2'-1"
1	A2	INTAKE	-2'-1"
1	B17	AUX	64'
1	B18	AUX	64'
1	B19	CNT PNTN	64'
1	B20	CNT PNTN	64'
1	B21	AUX	73'
1	B22	AUX	73'
1	B23	AUX	73'
1	B24	AUX	73'
1	B25	AUX	73'
1	B26	AUX	73'
1	B28	AUX	73'
1	101	TB	85'
1	102	TB	85'
1	103	TB	85'
1	104	TB	85'
1	104A	TB	85'
1	107	TB	85'
1	109	TB	85'
1	109A	TB	85'
1	111	TB	85'
1	113	TB	85'
1	113A	TB	85'
1	115	TB	85'
1	115A	TB	85'
1	116	CNT PNTN	85'
1	117	TB	85'
1	118	TB	85'
1	119	TB	85'
1	119A	TB	85'
1	124	TB	85'
1	143	TB	85'
1	144	AUX	85'
1	145	AUX	85'
1	146	AUX	85'
1	155	AUX	85'
1	163	AUX	85'
1	174A	AUX	85'
1	189A	AUX	85'
1	193	TB	85'

Unit	Door	Building	Elevation
2	A4	INTAKE	-2'-1"
2	A5	INTAKE	-2'-1"
2	B19-2	CNT PNTN	64'
2	B20-2	CNT PNTN	64'
2	B28-2	AUX	73'
2	B35-2	AUX	73'
2	B36-2	AUX	73'
2	B37-2	AUX	73'
2	B38-2	AUX	73'
2	B39-2	AUX	73'
2	B40-2	AUX	73'
2	B42-2	AUX	64'
2	B43-2	AUX	64'
2	101-2	TB	85'
2	102-2	TB	85'
2	103-2	TB	85'
2	104-2	TB	85'
2	107-2	TB	85'
2	109-2	TB	85'
2	109A-2	TB	85'
2	111-2	TB	85'
2	115A-2	TB	85'
2	116-2	TB	85'
2	117-2	TB	85'
2	118-2	TB	85'
2	119-2	TB	85'
2	119A-2	TB	85'
2	126A-2	TB	85'
2	127A-2	TB	85'
2	128-2	TB	85'
2	142-2	AUX	85'
2	159-2	AUX	85'
2	171-2	AUX	85'
2	174A-2	AUX	85'
2	189A-2	CNT PNTN	85'
2	197-2	CNT PNTN	85'
2	199F-2	TB	85'
2	199G-2	TB	85'
2	203-2	TB	107'
2	205-2	TB	107'
2	207-2	TB	107'

Table 18.7-1 (continued)
Fire Doors Controlled by ECG 18.7

Unit	Door	Building	Elevation
1	199B	TB	85'
1	199C	TB	85'
1	199D	AUX	85'
1	203	TB	107'
1	205	TB	107'
1	207	TB	107'
1	208	TB	107'
1	209	TB	107'
1	209A	TB	107'
1	209B	TB	107'
1	210	TB	107'
1	211	TB	107'
1	211A	TB	107'
1	212	TB	107'
1	214	TB	107'
1	215	TB	107'
1	221	AUX	104'
1	223	AUX	100'
1	224	AUX	100'
1	225	AUX	100'
1	226	AUX	100'
1	227	AUX	100'
1	228	AUX	100'
1	229	AUX	100'
1	230	AUX	100'
1	231	AUX	100'
1	232	AUX	100'
1	245	AUX	100'
1	258	AUX	100'
1	259	FHB	100'
1	262	FHB	100'
1	263	FHB	100'
1	265	FHB	100'
1	269	CNT PNTN	100'
1	279	FHB	100'
1	285	FHB	100'
1	297	FHB	100'
1	297A	FHB	100'
1	298	TB	107'
1	298A	TB	107'
1	298B	TB	107'

Unit	Door	Building	Elevation
2	208-2	TB	107'
2	209-2	TB	107'
2	210-2	TB	107'
2	211-2	TB	107'
2	214-2	TB	107'
2	215-2	TB	107'
2	217-2	TB	107'
2	217A-2	TB	107'
2	222-2	AUX	100'
2	233-2	AUX	100'
2	234-2	AUX	100'
2	234A-2	AUX	100'
2	235-2	AUX	100'
2	236-2	AUX	100'
2	237-2	AUX	100'
2	238-2	AUX	100'
2	239-2	AUX	100'
2	245-2	CNT PNTN	100'
2	258-2	AUX	100'
2	259-2	FHB	100'
2	262-2	FHB	100'
2	263-2	FHB	100'
2	265-2	FHB	100'
2	269-2	CNT PNTN	100'
2	279-2	FHB	100'
2	284-2	TB	107'
2	285-2	FHB	100'
2	297-2	TB	107'
2	297A-2	TB	107'
2	297B-2	TB	107'
2	297C-2	TB	107'
2	297D-2	TB	107'
2	298-2	FHB	100'
2	302-2	TB	119'
2	303-2	TB	119'
2	304-2	TB	119'
2	305-2	TB	119'
2	306-2	TB	119'
2	307-2	TB	119'
2	308-2	TB	119'
2	309-2	TB	119'

Table 18.7-1 (continued)
Fire Doors Controlled by ECG 18.7

Unit	Door	Building	Elevation
1	298C	TB	107'
1	301	TB	119'
1	302	TB	119'
1	303	TB	119'
1	304	TB	119'
1	305	TB	119'
1	306	TB	119'
1	307	TB	119'
1	308	TB	119'
1	309	TB	119'
1	310	TB	119'
1	311	TB	119'
1	322	TB	119'
1	324	AUX	115'
1	325	AUX	115'
1	326	AUX	115'
1	328	AUX	115'
1	333	AUX	115'
1	335	AUX	115'
1	337	AUX	115'
1	341	AUX	115'
1	342	AUX	115'
1	343	AUX	115'
1	348	AUX	115'
1	358	AUX	115'
1	364	CNT PNTN	115'-6"
1	402	AUX	128'
1	403	AUX	128'
1	404	AUX	128'
1	405	AUX	128'
1	406	AUX	128'
1	503	AUX	140'
1	508	AUX	140'
1	509	AUX	140'
1	560	AUX	140'
1	567	AUX	140'
1	603	AUX	154'

Unit	Door	Building	Elevation
2	310-2	TB	119'
2	311-2	TB	119'
2	323-2	AUX	115'
2	330-2	AUX	115'
2	331-2	AUX	115'
2	339-2	AUX	115'
2	340-2	AUX	115'
2	348-2	AUX	115'
2	358-2	FHB	115'
2	364-2	CNT PNTN	115'
2	392-2	TB	119'
2	401-2	AUX	128'
2	407-2	AUX	128'
2	408-2	AUX	128'
2	412-2	TB	128'
2	511-2	AUX	140'
2	605-2	AUX	154'

BASES

BACKGROUND (continued)

FIRE DAMPERS

Fire dampers are provided to prevent fire propagation across the associated fire rated barrier. Ventilation ducts penetrating established fire barriers are provided with fire rated dampers, or have a Fire Protection Engineering Evaluation (FPEE) to justify their acceptability. Automatically closing dampers on ventilation ducts penetrating areas protected by gas flooding systems provide isolation of the area to maintain gas concentration [Ref. NFPA 12 and NFPA 805] in addition to acting as a fire barrier. Smoke dampers may be required to minimize air leakage and to ensure fire damper operation in some ducts.

HATCHES

Hatches are installed to enable passage of equipment and materials through fire rated barriers. Hatches are comprised of noncombustible materials such as concrete and steel. Hatches in fire rated barriers are provided with U.L. fire rated hatches, or have an FPEE to justify their acceptability. Hatches must be maintained closed to be Operable.

PENETRATION SEALS

Penetration seals are essentially a sub-system of barriers. Penetration seals are typically comprised of heat resistant, materials such as; silicone foam, silicone elastomer, cementitious grout, plaster, ceramic fiber, caulk, rubber boots, steel caps or plugs, radflex, etc. Penetration seals are devices which seal openings in DCPP walls, floors, and ceilings and are credited for preventing the propagation of fire, products of combustion (smoke and hot gasses), HELB, flood and radiation. The specific function of a particular seal is therefore defined by the function of the barrier in which it is installed. In addition to maintaining the function of the barrier, penetration seals are designed so as not to interfere with the function of the item penetrating the barrier. The penetration seals addressed in this ECG are located outside containment in power block walls, floors, and ceilings and include penetration seals around pipe, conduit, cable tray, cable, HVAC ducts, instrument tubing and structural steel penetrates through barriers. Also addressed in this ECG are internal conduit seals, bus duct seals, seismic gap seals and expansion gap seals. Electrical cabling, cable trays or conduit, mechanical piping, and HVAC ducts penetrating fire barriers are typically provided with approved, fire resistant, penetration seal assemblies commensurate with the barrier's fire rating.

APPLICABLE SAFETY ANALYSIS

Safety analysis that apply to the operability of fire Rated Assemblies at DCPP include: the Nuclear Safety Capablity Assessment (NSCA) and FPEEs.

(continued)

BASES

LCO	The operability of Fire Rated Assemblies is necessary to protect plant equipment required to maintain the fuel in a safe and stable condition and to ensure that fire hazards do not result in the release of radioactivity, which could impact the health and safety of the public. Therefore, this equipment control guideline exists to ensure that the fire rated assemblies at DCPP will perform their safety function whenever the SSD equipment they protect is required to be OPERABLE. The FIRE RATED ASSEMBLIES are OPERABLE when the as found condition meets the as-designed condition. Abnormalities must be evaluated against the Acceptance criteria for the fire barrier per the appropriate STP. • STP M-70A • STP M-70B • STP M-70D • STP M-70.CRD • STP M-70.ROL • STP M-70.SWG
APPLICABILITY	As discussed above, the FIRE RATED ASSEMBLIES must be OPERABLE whenever the equipment they protect are required to be OPERABLE. This includes equipment, cables, instrumentation, controls, and support systems on either side of the barrier. This equipment includes the analyzed equipment necessary to maintain the fuel in a safe and stable condition. This requirement is necessary since these systems are credited for protecting SSD equipment from fire hazards.
ACTIONS	A Note has been added in the ACTIONS to provide clarification that separate condition entry is allowed for each ECG 18.7 fire barrier impairment. This is acceptable, since the Required Actions for each Condition provide appropriate compensatory actions for each inoperable fire rated assembly. A.1 In the event a fire rated assembly is inoperable, a method to prevent the spread of a fire must be provided. Action A.1 prevents the spread of a fire by requiring a continuous fire watch on at least one side of the affected assembly. A continuous fire watch in the affected areas is required to provide detection capability until the INOPERABLE fire rated assembly is restored. If a fire is detected, the fire watch will immediately notify the control room and the appropriate response will be initiated. (continued)

BASES

ACTIONS (continued)

A.1 (continued)

For specific fire detection zones listed in Table 18.7-2 (next page), it is acceptable to dispatch a single fire watch person to provide continuous fire watch coverage for all inoperable fire barriers in the entire fire detection zone. Fire watch personnel must stay within the assigned fire detection zone and must continuously transition between each room or fire area with inoperable fire barriers spending approximately the same amount of time in each room or area (i.e., the fire watch shall not remain in a room or fire area for a prolonged period of time). Each room or fire area with inoperable fire barriers within the assigned detection zone shall be surveyed for fire every 15 minutes or less.

The 15 minute continuous fire watch is a specific exception to the normal continuous fire watch. The 15 minute continuous fire watch has been approved for use via Licensing Basis Impact Evaluation (LBIE) 98-119A with some very specific restrictions. The 15 minute continuous fire watch allowance shall only be used in the areas authorized by this ECG.

If access between rooms or fire areas becomes restricted, such as by radiological barriers for surface contamination areas requiring use of step-off pads, continuous fire watches must be posted for each fire area.

All other ECG 18.7 areas not covered by Table 18.7-2 shall have continuous fire watch personnel dispatched to provide coverage for each affected room or fire area within the detection zone. The fire watch shall be continuously dedicated to the room or fire area.

(continued)

Table 18.7-2
Fire Detections Zones where "15 Minute Continuous" Fire Watch is Allowed

Unit 1 Fire Detector Zone	Unit 1 FSAR Fire Area or Zones	Description
A-3[1] Excluding Fire Area 13-E	13-A, 13-B, 13-C, 13-D	Turbine Building 119' North
A-4	12-A, 12-B, 12-C	Turbine Building 104; North
A-9	6-A-1, 6-A-2, 6-A-3, 6-A-4, 6-A-5	Battery and Inverters 115'
A-10	5-A-1, 5-A-2, 5-A-3, 5-A-4	480V Bus Rooms 100'
B-1	3-B-1, 3-B-2,3-C corridor	64' Aux Building
B-3	3-M, 3-L (BA Evap Rm only)	85' SI Pump Rooms
B-5	3-O, 3-Q-1, 3-Q-2, 3-X (BA transfer pumps only)	Fuel Handling Building 100'
B-7	3-P-4	115' Vent Area Filter Rooms
B-11	3-P-7	140' Vent E-5 Fan Rooms
B-12	3-P-8	140' Vent E-6 Fan Rooms
B-14	8-A, 8-G, 8-E	CR Computer Rm, SSPS Rm, SFM Office

Unit 2 Fire Detector Zone	Unit 2 FSAR Fire Areas or Zones	Description
A-3[1] Excluding Fire Area 24-E	24-A, 24-B, 24-C, 24-D	Turbine Building 119' South
A-4	23-A, 23-B, 23-C	Turbine Building 104; South
A-9	6-B-1, 6-B-2, 6-B-3, 6-B-4, 6-B-5	Battery and Inverters 115'
A-10	5-B-1, 5-B-2, 5-B-3, 5-B-4	480V Bus Rooms 100'
B-1	3-D-1, 3-D-2,3-C corridor	64' Aux Building
B-3	3-N, 3-L (BA Evap Rm only)	85' SI Pump Rooms
B-5	3-U, 3-T-1, 3-T-2, 3-X (BA transfer pumps only)	Fuel Handling Building 100'
B-7	3-V-4	115' Vent Area Filter Rooms
B-11	3-V-7	140' Vent E-5 Fan Rooms
B-12	3-V-8	140' Vent E-6 Fan Rooms
B-14	8-D, 8-F, 8-H	CR Computer Rm, SSPS Rm, SFM Office

(1) For Fire Detector Zone A-3, Fire Areas 13-E (Unit 1) and 24-E (Unit 2) are not included because they are separated by security doors from the other fire areas in Fire Detector Zone A-3.

BASES

ACTIONS
(continued)

A.2

Instead of stationing a continuous fire watch, the fire detectors or detection capability of the automatic fire suppression system on at least one side of the affected barrier may be verified OPERABLE and an hourly fire watch patrol established, until the barrier is restored to functional status. The fire detection or automatic fire suppression system must be contiguous to the affected barrier in order to credit it's operability, i.e. it must provide coverage up to and including the degraded fire rated assembly. Fire Zones or Fire Areas with area-wide detection or suppression or partial detection or suppression up to and including the degraded fire rated assembly, as shown in the Fire Protection 111906 DWGs, would be considered creditable.

The fire detection system is used as the primary means for detecting fires, however; the spray and/or sprinkler system flow switches as identified in Table 18.7-3 may be used as an alternate form of fire detection. The fire suppression system flow switches can be credited for detection by reviewing the results of the most recently performed fire water flow switch testing (Ref. STP M-63A). For instance, when a fusible link melts, water starts flowing in the system, which in turn causes a flow switch to activate. This action is indicated in the Control Room on the fire computer. Using the fire computer, Operators can determine the location of the flow switch and alert the fire brigade to respond to the incident. Table 18.7-3, cross-references flow switch and fire areas. Both the fire detectors and automatic fire suppression system provide detection and alarm capability in the control room for early warning of a fire, so that the operators can muster the fire brigade. Crediting both fire detection and automatic fire suppression systems for detection is consistent with the NRC's evaluation granting a D.C. Cook Technical Specification change (Ref. 9).

(continued)

Table 18.7-3

Flow Switches Credited as Detection

MONITORING FLOW SWITCH	UNIT	BLDG	ELEV	AREA DESCRIPTION	FIRE AREA	FIRE ZONE	SSD REDUNDANT EQUIP. Y/N	SPR ECG Y/N	SPR SYS CONTROL VALVE	BARRIER DWG 111906 SHEET NO.
0-FS-9	1	FHB	085'	AUX BOILER 0-1	2	-	N	N	0-20	17
0-FS-18	1	TURB	085'	DIRTY LUBE OIL RM	TB7	14B	N	N	1-50	6
0-FS-50	1	AUX	140'	ABVS FAN & EQUIP. RM	AB1	8B1	N	N	1-341	23
	1	AUX	154'	CR VENT FANS S35/S36 RM	CR1	8B3				25
	2	AUX	140'	ABVS FAN & EQUIP. RM	AB1	8B2				23
	2	AUX	154'	CR VENT FANS S37/S38 RM	CR1	8B4				25
1-FS-10	0	AUX	085'	ACCESS CONTROL	4B	-	Y	Y	1-37	17
	0	AUX	085'	CHEM LAB	4A					
1-FS-11	1	TURB	085'	MAIN TURB BLDG	TB7	14A	N	N	1-FP-11 1-42	6
	1	TURB	085'	DIESEL GEN HALLWAY	11D	-	Y	Y	1-355 1-42	6
	1	TURB	104'	MAIN TURB BLDG NORTH	TB7	14A	N	N	1-42	7
	1	TURB	119'	SWGR VENT FAN RM	13E	-	Y	Y	1-355 1-42	8
1-FS-12	1	TURB	104'	MAIN TURB BLDG NORTH	TB7	14A	N	N	1-42	7
1-FS-13	1	TURB	104'	MAIN TURB BLDG NORTH	TB7	14A	N	N	1-42	7
1-FS-17	0	TURB	119'	OPS WORK CONTROL	17	-	N	N	1-50	8, 13
	1	TURB	085'	DIRTY LUBE OIL RM	TB7	14B	N	N		6
	1	TURB	085'	AREA AROUND CCW HX RM	TB7	14A	Y	Y		6
	1	TURB	085'	CCW HX RM	TB7	14E	Y	Y		6
	1	TURB	104'	COLUMN LINE G FROM 11 - 15.7	TB7	14A	Y	Y		7
	1	TURB	119'	COLUMN LINE G FROM 11 - 15.7	TB7	14A	Y	Y		8
1-FS-20	1	TURB	104'	COLUMN LINE G FROM 11 - 15.7	TB7	14A	Y	Y	1-50	7
	1	TURB	119'	COLUMN LINE G FROM 11 - 15.7						8
1-FS-31	0	TURB	119'	OPS WORK CONTROL	17	-	N	N	1-50	8, 13

Table 18.7-3 (continued)

MONITORING FLOW SWITCH	UNIT	BLDG	ELEV	AREA DESCRIPTION	FIRE AREA	FIRE ZONE	SSD REDUNDANT EQUIP. Y/N	SPR ECG Y/N	SPR SYS CONTROL VALVE	BARRIER DWG 111906 SHEET NO.
	1	AUX	064'	RHR PP CORRIDOR DOOR	AB1	3B3				15
	1	AUX	073'	CCP 1-1/1-2 RM	3H1	-				16
1-FS-36	1	AUX	073'	CCW 1-1 PP RM	AB1	3J1	Y	Y	1-346 1-1294	16
	1	AUX	073'	CCW 1-2 PP RM	AB1	3J2				16
	1	AUX	073'	CCW 1-3 PP RM	AB1	3J3				16
	1	AUX	073'	CCP 1-3 RM	3H2	-				16
1-FS-38	1	PEN AREA	100'	100' PEN AREA	3BB	-	Y	Y	1-338	19
1-FS-39	1	PEN AREA	115'	115' PEN AREA	3BB	-	Y	Y	1-335	21
	1	FHB	100'	100' CORRIDOR	FB1	31	N	N		
1-FS-42	1	FHB	100'	MOTOR DRIVEN AFW PP RM	AB1	3Q2	Y	Y	1-332	19
	1	FHB	100'	TURB DRIVEN AFW PP RM	3Q1	-	Y	Y		
	1	TURB	085'	DIESEL GEN HALLWAY	11D	-			1-355 1-42	6
1-FS-48	1	TURB	119'	SWGR VENT FAN RM	13E	-	Y	Y		8
	2	TURB	085'	MAIN TURB BLDG	TB7	19A	N	N	2-FP-20 2-66	11
	2	TURB	085'	DIESEL GEN HALLWAY	22C	-	Y	Y	2-980 2-66	11
2-FS-11	2	TURB	104'	MAIN TURB BLDG SOUTH	TB7	19A	N	N	2-66	12
	2	TURB	119'	SWGR VENT FAN RM	TB13	24E	Y	Y	2-980 2-66	13
	2	TURB	119'	OPS READY RM AREA	TB13	25	N	N	2-66	13
2-FS-12	2	TURB	104'	MAIN TURB BLDG SOUTH	TB7	19A	N	N	2-66	12
2-FS-13	2	TURB	104'	MAIN TURB BLDG SOUTH	TB7	19A	N	N	2-66	12
	2	TURB	085'	DIESEL GEN HALLWAY	22C	-	Y	Y	2-980 2-66	11
2-FS-16	2	TURB	119'	OPS READY RM AREA	TB13	25	N	N	2-66	13
	2	TURB	119'	SWGR VENT FAN RM	TB13	24E	Y	Y	2-980 2-66	13

Table 18.7-3 (continued)

MONITORING FLOW SWITCH	UNIT	BLDG	ELEV	AREA DESCRIPTION	FIRE AREA	FIRE ZONE	SSD REDUNDANT EQUIP. Y/N	SPR ECG Y/N	SPR SYS CONTROL VALVE	BARRIER DWG 111906 SHEET NO.
	2	TURB	085'	CCW HX RM		19E				11
	2	TURB	085'	AREA AROUND CCW HX RM		19A				11
2-FS-17	2	TURB	104'	COLUMN LINE G FROM 20.3 - 25	TB7	19A	Y	Y	2-59	12
	2	TURB	119'	COLUMN LINE G FROM 20.3 - 25		19A				13
	2	TURB	104'	COLUMN LINE G FROM 20.3 - 25						12
2-FS-20					TB7	19A	Y	Y	2-59	
	2	TURB	119'	COLUMN LINE G FROM 20.3 - 25						13
	2	AUX	064'	RHR PP CORRIDOR DOOR	AB1	3D3				15
	2	AUX	073'	CCP 2-1/2-2 RM	3I1	-				16
2-FS-36	2	AUX	073'	CCW 2-1 PP RM	AB1	3K1	Y	Y	2-349 2-1294	16
	2	AUX	073'	CCW 2-2 PP RM	AB1	3K2				16
	2	AUX	073'	CCW 2-3 PP RM	AB1	3K3				16
	2	AUX	073'	CCP 2-3 RM	3I2	-				16
2-FS-38	2	PEN AREA	100'	100' PEN AREA	3CC	-	Y	Y	2-861	20
2-FS-39	2	PEN AREA	115'	115' PEN AREA	3CC	-	Y	Y	2-30	22
	2	FHB	100'	100' CORRIDOR	FB2	32	N	N		
2-FS-47	2	FHB	100'	MOTOR DRIVEN AFW PP RM	AB1	3T2	Y	Y	2-352	20
	2	FHB	100'	TURB DRIVEN AFW PP RM	3T1	-	Y	Y		
	2	TURB	085'	DIESEL GEN HALLWAY	22C	-			2-980 2-66	11
2-FS-49							Y	Y		
	2	TURB	119'	SWGR VENT FAN RM	TB13	24E				13
2-FS-51	2	TURB	119'	OPS READY RM AREA	TB13	25	N	N	2-66	13
2-FS-384	2	FHB	115'	SOUTH & EAST CORRIDOR	AB1	3W	N	N	2-1048	22

BASES

ACTIONS	A.3 A different compensatory measure or combination of measures (e.g., additional administrative controls, operator briefings, temporary procedures, interim shutdown strategies, operator manual actions, temporary fire barriers, temporary detection or suppression systems) may be implemented in lieu of Required Actions A.1, or A.2.1 and A.2.2, or A.3. A documented evaluation of the impact of the proposed alternate compensatory measure and its adequacy compared to the compensatory measure required by the ECG must be completed. The evaluation must demonstrate that the alternate compensatory measure would not adversely affect the ability to maintain the fuel in a safe and stable condition in the event of a fire. Any alternate compensatory measure must maintain compliance with the General Design Criteria and 10 CFR 50.48(a), and must be retained as a record pursuant to 10 CFR 50.48(a). The evaluation of the alternate compensatory measure should incorporate risk insights regarding the location, quantity, and type of combustible material in the fire area; the presence of ignition sources and their likelihood of occurrence; the automatic fire suppression and fire detection capability in the fire area; the manual fire suppression capability in the fire area; and the human error probability where applicable.

BASES

SURVEILLANCE REQUIREMENTS

Surveillance Requirements were originally established in the fire protection Technical Specifications (TSs) when the plant was licensed. Since that time, the fire protection TSs have been converted to Equipment Control Guidelines. Few changes have been made to the surveillance requirements in the fire protection ECGs; the changes have been approved under the 50.59 Safety Evaluation Process.

SR 18.7.1

Visually inspect each of the fire rated assemblies, except penetration seals, to verify functionality.

Fire Rated Assemblies consists of fire barriers (concrete, plaster, gypsum, etc.), fire rated enclosures (3-M, pyrocrete, plaster, etc.), fire doors, fire dampers, and hatches. Penetration seal surveillance requirements are discussed in SR 18.7.2. The fire rated assemblies are inspected on an 18 month frequency. The 18 month surveillance frequency was established by the NRC in the original TS, and is sufficient to ensure that the fire rated assemblies are available whenever the equipment it protects must be OPERABLE.

Fire rated assemblies that are inaccessible during normal power operation will be inspected every 24 months. Examples include fire rated assemblies located inside containment and PRA high risk activities involving the clearing of ventilation to perform inspection of fire dampers. The 24 month surveillance frequency is consistent with 24 month refueling cycles. The basis for this frequency is that past surveillance, maintenance, and operational history have demonstrated that the fire rated assemblies remain intact and can be expected to perform their required safety function when inspected on a 24 month interval. Additionally, the fire rated assemblies inside containment are not inspected since damage is unlikely to occur when the plant is at power and ALARA concerns are avoided since radiological doses significantly decrease during refueling outage periods.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 18.7.2

"Fire rated penetration seals shall be verified to be OPERABLE by performing a visual inspection of at least 10 percent of each type of penetration seal, on average. 10 percent, on average, is equivalent to an inspection population comprised of 10 percent of the total penetration seal population, with the percentage inspected for each individual seal type potentially being less than 10 percent. If an unacceptable degradation is identified, an engineering evaluation of the degradation shall be performed. The results of the analysis will be used to determine if the degraded penetration seal is still capable of performing its safety function. If the seal is deemed to be nonfunctional, an engineering evaluation will be performed to determine whether a new sample population of penetration seals shall be inspected. The population size and type will be determined based on the results of the engineering evaluation. If a new sample population is inspected, the inspection process shall continue until no additional non-functional seals are found in the sample population(s)."

This surveillance activity will verify the operability of 10 percent of each seal type, on average. 100 percent of all types of penetration seals will be inspected over a 15 year period. An 18 month surveillance frequency is sufficient to ensure these components will function properly whenever the SSD equipment they are protecting is required to be OPERABLE.

The DCPP fire protection program requirements were originally established in the DCPP TS. The surveillance inspection scope for penetration seal was a 100 percent visual inspection of all types of penetration seals over an 18 month period. The basis for the surveillance scope change was that as part of the Penetration Seal Re-verification Program a minimum of two, 100 percent enhanced inspections of each identified component was conducted, with only a small percentage of seal failures attributed to seal degradation. Design controls have been enhanced to assure configuration control, Westinghouse standard TS originally allowed for a 10 percent sample program, and several utilities were originally licensed with or have subsequently transitioned to a 10 percent inspection program.

SR 18.7.3

Verify fire rated assemblies to be functional following repairs or maintenance by the performance of a visual inspection of the affected fire rated assemblies. This action is required prior to returning a fire rated assembly to a functional status.

(continued)

BASES

REFERENCES

1. The DCPP Operating Licenses for Units 1 & 2.
2. National Fire Protection Association (NFPA) 805: Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants (2001 edition).
3. License Amendments 225/227, dated April 14, 2016, Amendment No. 225/227 to Facility Operating License No. DPR-80/DPR-82 [Transition to a Risk-Informed, Performance-Based Fire Protection Program in accordance with 10 CFR 50.48(c) (NFPA 805)].
4. Design Criteria Memorandum DCM S-18, "Fire Protection Systems."
5. Design Criteria Memorandum DCM S-98, "Penetration Seals."
6. DCPP Fire Protection System Drawings 111906 Series.
7. OM8.ID2, "Fire System Impairment."
8. License Amendment Request 90-11, "Revision of Fire Protection License Conditions, Relocation of Fire Protection Technical Specifications, and Clarification of AFW Water Sources."
9. Letter from NRC to Indiana and Michigan Electric Company dated 7/15/86. Letter from NRC to Indiana and Michigan Electric Company dated 2/8/90.
10. Letter from NRC to Pacific Gas and Electric, dated 1/27/00, Safety Evaluation by the Office of Nuclear Reactor Regulation Related to the Request for NRC Approval of a Revision to the Licensee's Requirements for Certain Continuous Fire Watches.
11. NRC Regulatory Issue Summary 2005-07, "Compensatory Measures to Satisfy the Fire Protection Program Requirements," April 19, 2005.
12. Calculation M-1177, "Nuclear Safety Capability Assessment (NSCA)."

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-A7

Title: Determine 230 kV OPERABILITY

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform __X__ Simulate_____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: Designed for SRO candidates in a classroom setting.

References: OP J-2:VIII, rev 32
LCO 3.8.1, AC Sources – Operating, rev 12

Alternate Path: Yes _____ No ____X____

Time Critical: Yes _____ No ____X____

Time Allotment: 20 minutes

Critical Steps: See Examinee Response - Key

Job Designation: SRO

Rev Comments: New

Gen KA # / Rating: G2.2.37 - Ability to determine operability and/or availability of safety related equipment 4.6

RON FORTIER DATE: **12/02/19**
AUTHOR

CHRIS MEHIGAN DATE: **12/03/19**
OPERATIONS REPRESENTATIVE

Directions: All actions taken by examinee should be clearly documented. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure (as applicable) and told the steps with which to begin.

Required Materials: OP J-2:VIII, rev 32
LCO 3.8.1

Initial Conditions: GIVEN:

- Both Unit 1 and 2 are at 100% power
- Emergency Diesel Generator 1-2 is declared inoperable
- Two minutes after Diesel Generator 1-2 is declared inoperable, an earthquake causes a grid disturbance
- Grid Control reports:
  - loss of the Morro Bay-Diablo Canyon 230 kV line
  - 230 kV voltage is 230 kV
  - Los Padres Area Load is 350 MW
  - DCPP has 0 capacitors in service
  - Mesa has 4 capacitors and 1 transformer in service
- No operator compensatory actions have been taken or LCO ACTION(s) have been entered
- LTC is in AUTO
- 52VU11 is OPEN

Initiating Cue: You are instructed to:

- Using OP J-2:VIII, Guidelines for Reliable Transmission Service for DCPP, Attachment 2, 230kV Offsite Power Operability Evaluation - LTC IN AUTO, determine the OPERABILITY of 230 kV at this time (show your work)
- Determine the LCO ACTION(s) Unit 1 should enter

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.
- If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

** Denotes Critical Step and Sub-Steps

Task Standard:

NOTE: Do NOT provide examinee with Task Standard :

- 230 kV is **inoperable** (see key for determination)
- LCO 3.8.1A, B and D must be entered

Start Time: _____ **End Time:** _____

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

_____

_____

Examinee Response - Key
1. 230 kV is inoperable • **Determined OP J-2-VIII, Table 1, Row 2-11 (Morro Bay-Diablo Canyon 230 kV Line) applies** • **Determined "NO" to 230 kV switchyard voltage greater than Table 1 Normal Transfer Level (230 vs 231)** **NOTE: Candidate may not explicitly mark up attachment but will have verified the next two steps as part of reaching the conclusion that 230 kV is inoperable** • **(Determined Electrical Configuration is "3", Power, from attachment 1)** • **(Determined "NO" to Comp actions complete)** • **Determined 230 kV inoperable** **NOTE: candidate may add comp measures that could be taken to make 230 kV OPERABLE. This is NOT part of the grading criteria. If their answer is based on the comp measures, tell student to refer to their initial cue.** **2. LCO 3.8.1 Action(s) in effect (all required):** • **Action A** • **Action B** • **Action D**

** Denotes Critical Step and Sub-Steps

Pacific Gas and Electric Company®

System Dispatch Instruction: O-23
Publication Date: [09/17/2018] Rev: 5.0

Operating Instruction for Reliable Transmission Service to Diablo Canyon Power Plant

Appendix 4 - TABLE 1

Page 2 of 19

Table 1

230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Single element outage * * ***

Morro Bay-Diablo Canyon 230kV Line

	ROW # (X-Y)	Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)
2-	1	2	4	1	229	475	229	535	1
	2		3		234	425	229	480	2
	3		2		230	400	229	415	3
	4		1		229	345	229	345	4
	5		0		Not Functional		Not Functional		5
	6	1	4	1	229	410	229	480	6
	7		3		229	325	229	400	7
	8		2		Not Functional		229	330	8
	9		1		Not Functional		Not Functional		9
	10		0		Not Functional		Not Functional		10
	11	0	4	1	231	305	229	395	11
	12		3		Not Functional		229	325	12
	13		2		Not Functional		Not Functional		13
	14		1		Not Functional		Not Functional		14
	15		0		Not Functional		Not Functional		15

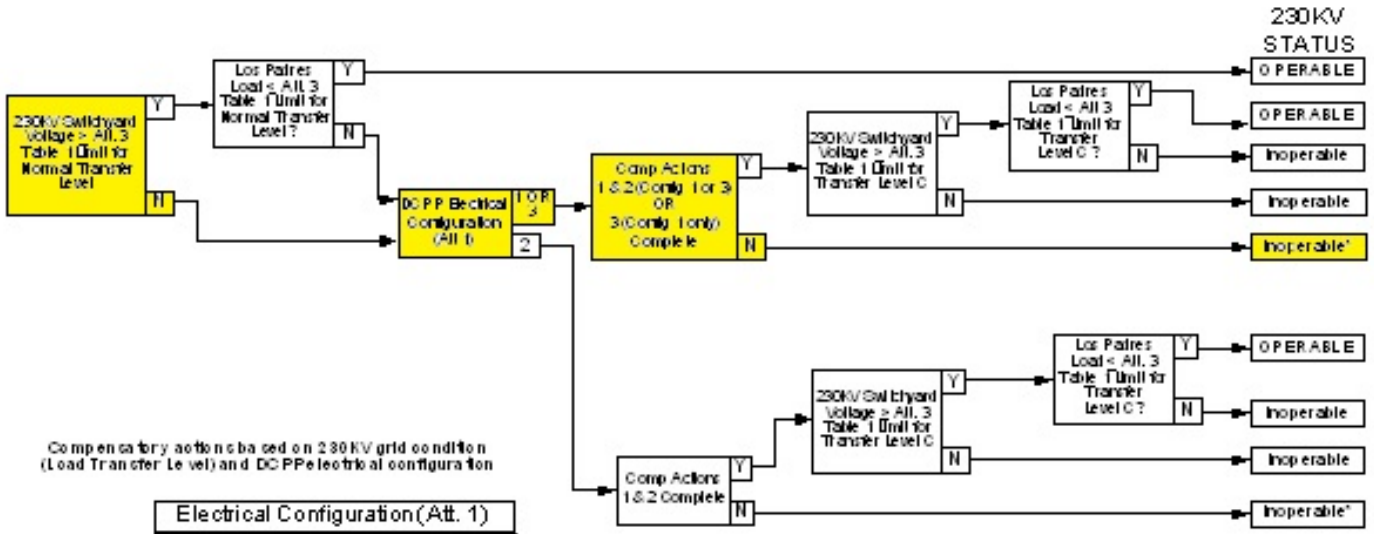
IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

Notes on page 19 of Table 1

230kV Offsite Power Operability Evaluation - LTC IN AUTO

U1&2 Attachment 2: Page 1 of 1

230KV



Compensatory actions based on 230KV grid condition (Load Transfer Level) and DCPP electrical configuration

Load Transfer Level (Att. 3 Table 1)	Electrical Configuration (Att. 1)		
	Config 1 Backfeed	Config 2 Transfer	Config 3 Power
Norm	None	None	None
A	Levels A & B Not Used		
B			
C	(1 & 2) OR 3	1 & 2	1 & 2

* - Determine if performing compensatory actions will restore operability.

Compensatory Actions

1. Auto start on unit trip of ALL standby Condensate /Booster Pump Sets blocked
2. Auto transfer of 12KV Bus D OR Bus E blocked
3. Both 12KV Buses D AND E unloaded

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources - Operating

LCO 3.8.1 The following AC electrical sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and

b. Three diesel generators (DGs) capable of supplying the onsite Class 1E power distribution subsystem(s); and

c. Two supply trains of the diesel fuel oil (DFO) transfer system.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

----------NOTE----------
LCO 3.0.4b is not applicable to DGs.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required offsite circuit inoperable.	A.1	Perform SR 3.8.1.1 for required OPERABLE offsite circuit.	1 hour AND Once per 8 hours thereafter.
	AND		
	A.2	Restore required offsite circuit to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One DG inoperable.	B.1	Perform SR 3.8.1.1 for the required offsite circuit(s).	1 hour AND Once per 8 hours thereafter.
	AND		
		----------NOTE---------- In MODE 1, 2, and 3, TDAFW pump is considered a required redundant feature. ----------	
	B.2	Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s).
	AND		
	B.3.1	Determine OPERABLE DG(s) is not inoperable due to common cause failure.	24 hours
		OR	
	B.3.2	Perform SR 3.8.1.2 for OPERABLE DG(s).	24 hours
	AND		
	B.4	Restore DG to OPERABLE status.	14 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Two required offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. AND C.2 Restore one required offsite circuit to OPERABLE status.	12 hours from discovery of Condition C concurrent with inoperability of redundant required features. 24 hours
D. One required offsite circuit inoperable. AND One DG inoperable.	D.1 Restore required offsite circuit to OPERABLE status. OR D.2 Restore DG to OPERABLE status.	12 hours 12 hours
E. Two or more DGs inoperable.	E.1 Ensure at least two DGs are OPERABLE.	2 hours
F. One supply train of the DFO transfer system inoperable.	F.1 Restore the DFO transfer system to OPERABLE status.	72 hours
G. Two supply trains of the DFO transfer system inoperable.	G.1 Restore one train of the DFO transfer system to OPERABLE status.	1 hour
H. Required Action and associated Completion Time of Condition A, B, C, D, E, F or G not met.	H.1 Be in MODE 3. AND H.2 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 4. ---------- Be in MODE 4.	6 hours 12 hours

(continued)

Initial Conditions:

GIVEN:

- Both Unit 1 and 2 are at 100% power
- Emergency Diesel Generator 1-2 is declared inoperable
- Two minutes after Diesel Generator 1-2 is declared inoperable, an earthquake causes a grid disturbance
- Grid Control reports:
  - loss of the Morro Bay-Diablo Canyon 230 kV line
  - 230 kV voltage is 230 kV
  - Los Padres Area Load is 350 MW
  - DCPP has 0 capacitors in service
  - Mesa has 4 capacitors and 1 transformer in service
- No operator compensatory actions have been taken or LCO ACTION(s) have been entered
- LTC is in AUTO
- 52VU11 is OPEN

Initiating Cue:

You are instructed to:

- Using OP J-2:VIII, Guidelines for Reliable Transmission Service for DCPP, Attachment 2, 230kV Offsite Power Operability Evaluation - LTC IN AUTO, determine the OPERABILITY of 230 kV at this time (show your work)
- Determine the LCO ACTION(s) Unit 1 should enter

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.
- If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

Examinee Response
1. 230 kV is inoperable or OPERABLE **Basis:** **2. All LCO Action(s) in effect:**

Guidelines for Reliable Transmission Service for DCPP

09/17/18
Effective Date

QUALITY RELATED

Table of Contents

1. SCOPE

1.1 This procedure contains instructions to assist the Diablo Canyon Power Plant (DCPP) Control Room in making operability determinations regarding each of the offsite power system sources. This determination is based upon the following factors:[T35523]

1.1.1 230-kV Source:

- Startup transformer LTC mode of operation
- 230-kV system voltage at the switchyard
- Los Padres area load (MWe)
- DCPP electrical configuration and load transfer level
- 230-kV line configuration
- DCPP and MESA capacitor banks in service

1.1.2 500-kV Source:

- 500-kV outlet line availability
- 500-kV voltage at the switchyard

1.2 Attachment 3 contains Transmission Department Guideline O-23, "Operating Instructions for Reliable Transmission Service to Diablo Canyon Power Plant." This guideline contains instructions for operating the transmission system and dispatching DCPP.

1.3 The operability of 12-kV, 4.16-kV, and 480 VAC buses is not within the scope of this procedure. For determining operability of these buses, REFER TO STP I-1C, "Routine Weekly Checks Required by Licenses."

2. DISCUSSION

2.1 The following are examples of situations in which evaluation of the 230-kV system as an offsite power source for DCPP may be required:

- Transmission lines are disabled such that the ability of the system to supply DCPP load and voltage requirements is degraded.
- Abnormal system voltages exist which limit the ability of DCPP bus transfer equipment to operate as designed.
- Abnormally heavy system loading in the Los Padres Division.
- Capacitor bank(s) unavailable.

3. RESPONSIBILITIES

3.1 The operations SFM is responsible for making Offsite Power Source operability determinations for DCPP based on grid and plant conditions. The SFM is also responsible for Tech Spec entries due to inoperable electrical sources or equipment.

3.2 The Grid Control Center (GCC) South Coast Operator has operating jurisdiction of both Diablo Canyon Switchyards via California Independent System Operator (CAISO). GCC also has operational jurisdiction over all equipment in the yards.

4. PREREQUISITES

None

5. PRECAUTIONS AND LIMITATIONS

5.1 Revisions to this procedure shall coincide with revisions to O-23, "Operating Instructions for Reliable Transmission Service to Diablo Canyon Power Plant." O-23 requires the following approvals due to multiple users and system operation needs:

- Station Director, DCPP
- Executive Vice President, Electric Operations

5.2 Startup Transformer Load Tap Changers (LTCs) maintain voltage as follows:

- With both startup feeder breakers open, voltage is maintained at 12.9-kV (107.5%).
- With either startup feeder breaker closed, voltage is maintained at 12-kV (100%).

5.3 With the LTC voltage at the upper setting, the 4-kV and 480 VAC buses will experience higher voltages.

5.4 Placing the LTC in manual results in an inoperable 230-kV system. This operation during startups and shutdowns should be expedited to reduce the time the 230-kV system is inoperable.

5.5 Portions of the 230 kV offsite power source are licensed as a Unit 1 & 2 shared resource. The 230 kV system offsite power source is designed to have sufficient capacity and capability to perform BOTH of the following:[Ref 7.3.4]

- Operate the ESF system for a design-basis accident on one unit while performing a safe shutdown on the other unit.
- Operate the ESF system for a dual unit trip as a result of an earthquake or abnormal operational occurrence.

5.6 The following procedures provide instruction for grid restrictions during DG maintenance and/or testing:

- OP J-6B:IX, "Diesel Generator Extended On-Line Maintenance" if a DG MOW is in progress
- OP J-6B:X, :XI, :XII, "Diesel Generator… Clearing" if a DG is cleared
- STP M-9G, "DG 24 hour Load Test and Hot Restart test" if test is in progress

5.7 Regarding the Special Protection Scheme (SPS) and Unit Selector Switch:

5.7.1 The Diablo Canyon SPS has a Unit Selector Switch at the 500-kV Switchyard Control Room that is used to manually select which of the two units is the preferred unit to trip. However, **the SPS may trip the unit that is NOT selected by this switch**. The SPS contains logic that executes a wide range of combinations between possible events and bus configurations that it will override this selector switch, when necessary. The "trip" in this context means opening the generator 500-kV breakers for a load rejection on that unit.

5.7.2 Selection of the unit NOT preferred to trip by SPS may be influenced by the following, but not limited to:

- A unit at end of core life.
- A unit's known or suspected nuclear fuel leak.
- A unit's SG primary-to-secondary leak.
- Maintenance on equipment that places the unit on a very high PRA risk.
- Known equipment problems such as steam dumps, rod control problems or turbine DEH Control that could challenge the survival of a load rejection.
- Problems with PZR or SG safeties such that placing the unit in hot standby would be complicated.

5.7.3 The manual selection of which unit to trip by SPS should take into consideration that a unit curtailed at 70% load or less will likely survive a load rejection.

5.7.4 Plant curtailment in 2-line schemes of operation (one 500-kV outlet line is out of service) will not be necessary if the SPS is armed (operational).

5.7.5 If SPS is armed, plant management may choose to proactively back down below the MW arming levels in certain situations PER OP C-3:III. The following are examples that could lead to that decision:

- Hot summer days.
- Special CAISO events.
- Line relay protection out of service.
- Transmission requests for line clearance.
- Condenser tunnel cleaning.
- 500-kV line outage scheduling.
- Fire potentially taking out both 500-kV lines to Midway.
- Fire approaching the line.
- DG maintenance.
- Fire potentially taking out a 230-kV line with no offsite support to preserve the 500-kV lines.
- Personnel experience with SPS.

6. INSTRUCTIONS

6.1 Considerations for 500-kV System Operability

NOTE:	Both 6.1.1 and 6.1.2 are required for the 500-kV System to be OPERABLE.

6.1.1 500-kV switchyard is connected to the grid by at least one of the three 500-kV lines (Gates, Midway #2, Midway #3).

6.1.2 500-kV switchyard voltage is greater than 512-kV.

6.2 Considerations for 230-kV System Operability

NOTE:	System conditions in Attachment 3 that are blank (shown as "---") represent unanalyzed conditions. Operation under these system conditions requires entry into TS 3.8.1, "AC Sources" - Operating" Condition A.

6.2.1 REFER TO Attachment 3 Section 3, "230-kV Off Site Power."[T36915]

6.2.2 REFER TO Attachment 5, "230-kV Lines Normal Alignment Diagram."

6.2.3 WHEN notified by GCC South Coast Operator of changes to 230-kV operability OR plant conditions change,
THEN obtain the information needed from GCC and from the Control Room to make an operability determination AND record on Attachment 4.

6.2.4 IF LTC is in MANUAL,
THEN the 230-kV offsite power is INOPERABLE.[Ref 7.1.8]

6.2.5 IF 52VU11 is CLOSED,
THEN the 230-kV offsite power is INOPERABLE.

6.2.6 IF 52VU11 is OPEN
AND the LTC is in AUTO,
THEN REFER TO Attachment 2, "LTC in AUTO," for evaluation.

NOTE:	Compensatory actions as required by the applicable attachment must be in effect before the 230-kV power source can be declared operable or maintained operable for the given or expected conditions.

6.2.7 Complete evaluation PER Attachment 2.

a. IF Compensatory Action 1 of Attachment 2 is required, THEN block ALL standby condensate booster pump sets:

1. Unit 1:

a) Record as-found configuration of Condensate/Booster Pump Set block switches (inside rear of VB4):

1) Condensate/Booster Pump 1-1

[ ] Block [ ] Normal

2) Condensate/Booster Pump 1-2

[ ] Block [ ] Normal

3) Condensate/Booster Pump 1-3

[ ] Block [ ] Normal

b) Ensure in "BLOCK" all Condensate/Booster Pump Set block switches.

- Cnd & Bstr Pump Set 1-1, "BLOCK"
- Cnd & Bstr Pump Set 1-2, "BLOCK"
- Cnd & Bstr Pump Set 1-3, "BLOCK"

2. Unit 2:

a) Record as-found configuration of Condensate/Booster Pump Set block switches (inside rear of VB4):

1) Condensate/Booster Pump 2-1

[ ] Block [ ] Normal

2) Condensate/Booster Pump 2-2

[ ] Block [ ] Normal

3) Condensate/Booster Pump 2-3

[ ] Block [ ] Normal

b) Ensure in "BLOCK" all Condensate/Booster Pump Set block switches.

- Cnd & Bstr Pump Set 2-1, "BLOCK"
- Cnd & Bstr Pump Set 2-2, "BLOCK"
- Cnd & Bstr Pump Set 2-3, "BLOCK"

CAUTION: The 12-kV bus with the Circulating Water Pump selected for auto-reclose should NOT be blocked in the following step.

b. IF Compensatory Action 2 of Attachment 2 is required, THEN perform the following:

1. On Unit 1, perform ONE of the following to block the automatic transfer of the 12k-kV Bus to Startup power:

NOTE: Blocking 12-kV Bus D will cause the loss of CWP 1-1, RCP 1-2 and RCP 1-4 if an automatic transfer is initiated.

- Place 12-kV Bus D Auto XFR to S/U switch in CUT OUT.

OR

NOTE: Blocking 12-kV Bus E will cause the loss of CWP 1-2, RCP 1-1 and RCP 1-3 if an automatic transfer is initiated.

- Place 12-kV Bus E Auto XFR to S/U switch in CUT OUT.

2. On Unit 2, perform ONE of the following to block the automatic transfer of the 12k-kV Bus to Startup power:

NOTE: Blocking 12-kV Bus D will cause the loss of CWP 2-1, RCP 2-2 and RCP 2-4 if an automatic transfer is initiated.

- Place 12-kV Bus D Auto XFR to S/U switch in CUT OUT.

OR

NOTE: Blocking 12-kV Bus E will cause the loss of CWP 2-2, RCP 2-1 and RCP 2-3 if an automatic transfer is initiated.

- Place 12-kV Bus D Auto XFR to S/U switch in CUT OUT.

c. IF Compensatory Action 3 of Attachment 2 is required, THEN ensure BOTH of the following are unloaded:

- 12-kV Bus D
- 12-kV Bus E

NOTE:	The times between 1700 and 2000 and between 0200 and 0400 represent the high and low system load periods respectively; voltage and load will have the greatest tendency to be outside of required limits at these times.

6.2.8 IF one 230-kV line is out of service,
THEN monitor 230-kV system voltage and Los Padres load using SCADA once between 1700 and 2000 AND once between 0200 and 0400.

6.2.9 IF two 230-kV lines are out of service,
THEN monitor hourly 230-kV system voltage and Los Padres load using SCADA.

NOTE:	Some compensatory actions may remain if the SFM deems them required for plant conditions.

6.2.10 WHEN compensatory actions are no longer required
AND requested by SFM,
THEN ensure compensatory measures removed.

a. IF Compensatory Action 1 of Attachment 2 was implemented,
THEN perform the following:

1. Return Unit 1 Condensate/Booster Pump Set block switches to step 6.2.7a.1.a) as-found configuration (inside rear of VB4):

a) Condensate/Booster Pump 1-1

[ ] Block [ ] Normal

b) Condensate/Booster Pump 1-2

[ ] Block [ ] Normal

c) Condensate/Booster Pump 1-3

[ ] Block [ ] Normal

2. Return Unit 2 Condensate/Booster Pump Set block switches to step 6.2.7a.2.a) as-found configuration (inside rear of VB4):

a) Condensate/Booster Pump 2-1

[ ] Block [ ] Normal

b) Condensate/Booster Pump 2-2

[ ] Block [ ] Normal

c) Condensate/Booster Pump 2-3

[ ] Block [ ] Normal

b. IF Compensatory Action 2 of Attachment 2 was implemented, THEN ensure CUT IN the following switches:
   - Auto XFR to S/U on Unit 1 12kV Bus D
   - Auto XFR to S/U on Unit 1 12kV Bus E
   - Auto XFR to S/U on Unit 2 12kV Bus D
   - Auto XFR to S/U on Unit 2 12kV Bus E

c. Ensure the following switches in AUTO (pushed):
   - S/U XFMR 1-1 Low Side Voltage Adjust
   - S/U XFMR 2-1 Low Side Voltage Adjust

6.3 Radial Feed Conditions

NOTE: A radial feed condition is one of the following configurations:
- Utilizing a single 230kV bus Sec "E" at Morro Bay
- Morro Bay - DCPP 230-kV line out of service
- Morro Bay - Mesa 230-kV line out of service
- DCPP - Mesa 230-kV line out of service

6.3.1 WHEN a radial feed condition exists, THEN perform the following:

a. WHEN performing risk evaluations using the configuration risk management software (CRMS), THEN ensure the appropriate Train Level SSC (TLS) code is entered.

b. IF the Unit is in Modes 1-4, THEN perform the following:

1. Ensure non-emergent work that may render any DG unavailable is NOT performed.[Ref 7.1.8]

2. Post two diesel generators per unit as protected equipment PER OP O-36, "Protected Equipment Postings," as follows:[Ref 7.1.9/7.1.10]
   - WHEN in a Bus F, G or H Week, THEN post the diesel generators not associated with the Bus Matrix Week.
   - WHEN in a Bus X Week, THEN post any two diesel generators.

6.3.2 WHEN the radial feed condition no longer exists, THEN remove postings on diesel generators not protected for other reasons PER OP O-36.

6.3.3 Ensure a radial feed on the 230-kV system with only one 500-kV output breaker in service is NOT scheduled.[Ref 7.1.8]

7. REFERENCES

7.1 ARs/Notifications

7.1.1 A0419055, "STP I-1C Voltage Limits for 4kV and 480V Buses Need Eval"

7.1.2 A0505071, "Inadvertent Transfer of a 4kV Vital Bus to Startup"

7.1.3 A0528007, "Startup Power Inoperable with Tap Changer in Manual," AE 3

7.1.4 50455129, "STP I-1C 480V Maximum Voltage"

7.1.5 50481860, "Startup Xfmr LTC in Manual Evaluation"

7.1.6 50503487, "230 kV Trans Network Line Capacity"

7.1.7 50508293, "Request that PRA information be Put Into OP J-2:VIII"

7.1.8 50572399, "Risk of Morro Bay 230 kV Configuration"

7.1.9 50593182, "OP J-2:VIII, D/G Posting Expectations"

7.1.10 50684607, "Request approval to revise OP J-2:VIII"

7.2 Drawings

7.2.1 437566, "Schematic Diagram - Condensate and Condensate Booster Pumps"

7.2.2 414351, "Single Line Diagram - Morro Bay Power Plant"

7.3 Other

7.3.1 Calculation 357A-DC, "Units 1 & 2 Load Flow, Short Circuit, and Motor Starting"

7.3.2 Calculation 359-DC, "230kV Grid Interface Requirements as a DCPP Offsite Power source"

7.3.3 California Independent System Operator, Transmission Control Agreement, Appendix E, Nuclear Protocols

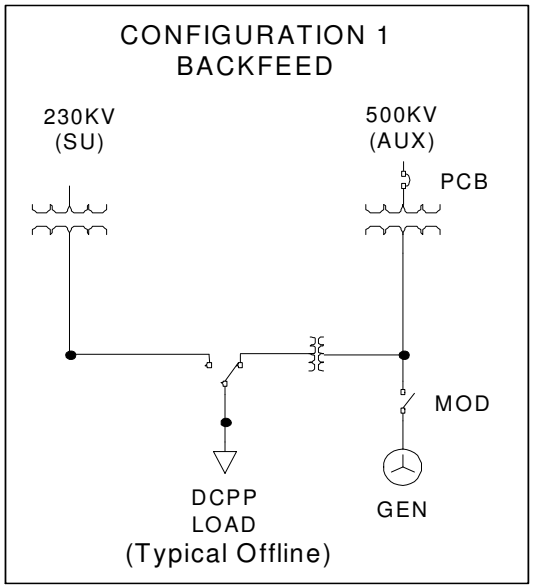
7.3.4 NRC Letter dated December 14, 2009, "Diablo Canyon Power Plant, Unit Nos 1 and 2 - Request for Technical Specification Interpretation of 230 Kilovolt System Operability (TAC Nos ME0711 and ME0712)"

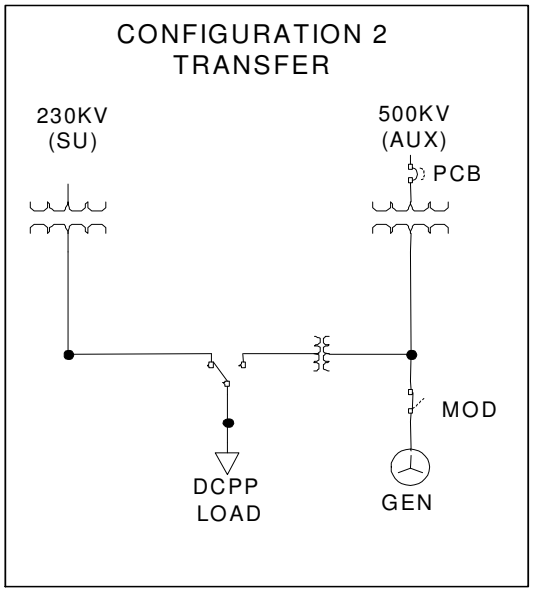
7.3.5 STP I-1C, "Routine Weekly Checks Required By License"

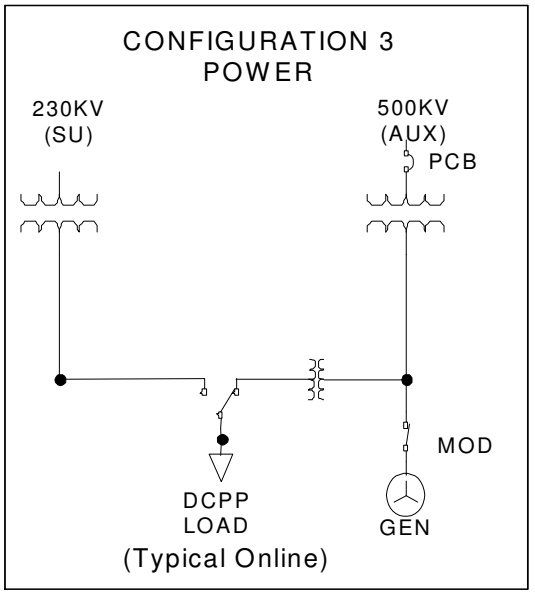
8. RECORDS

8.1 There are no retention requirements for this procedure.

Diablo Canyon Electrical Alignment Configurations **U1&2 Attachment 1: Page 1 of 1**



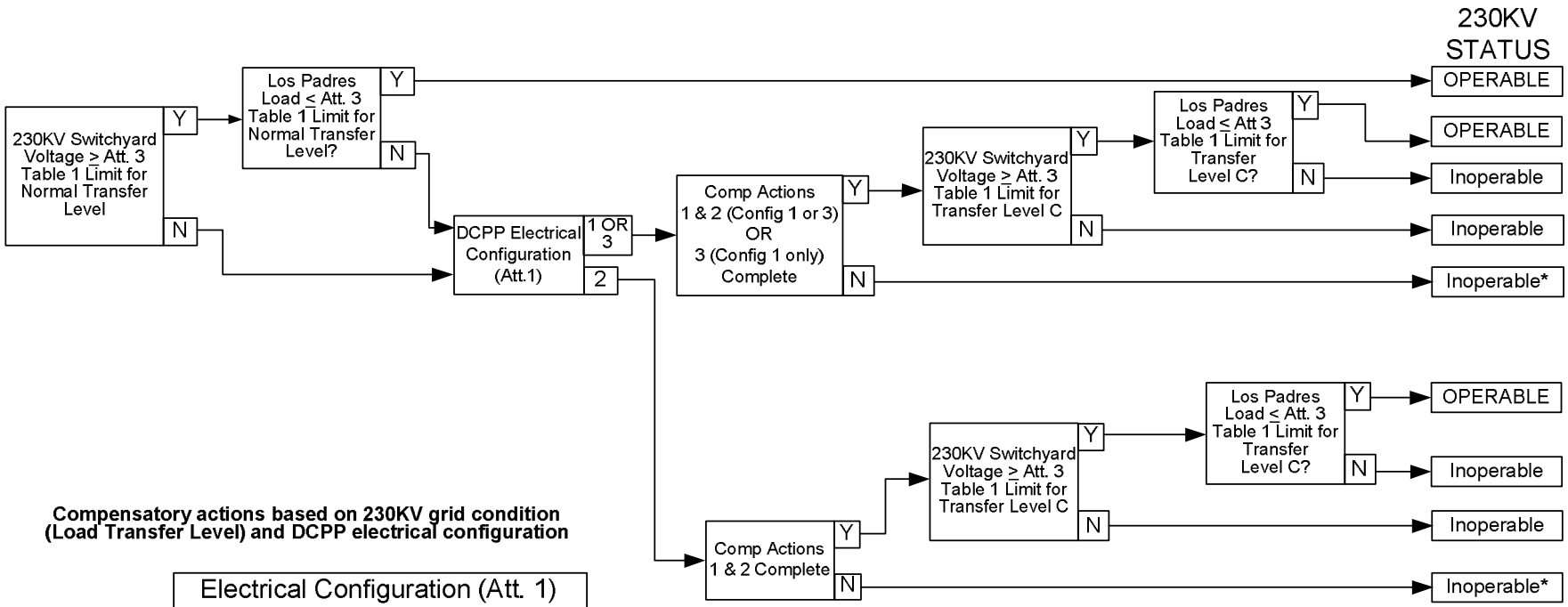




NOTE: Configuration 2 (Transfer) applies when at least one 12kV bus is aligned to Startup; other buses aligned to either Startup or Aux.

230kV Offsite Power Operability Evaluation - LTC IN AUTO

U1&2 Attachment 2: Page 1 of 1



Compensatory actions based on 230KV grid condition (Load Transfer Level) and DCPP electrical configuration

Load Transfer Level (Att. 3 Table 1)	Electrical Configuration (Att. 1)		
	Config 1 Backfeed	Config 2 Transfer	Config 3 Power
Norm	None	None	None
A	Levels A & B Not Used		
B			
C	(1 & 2) OR 3	1 & 2	1 & 2

* - Determine if performing compensatory actions will restore operability.

Compensatory Actions

1. Auto start on unit trip of ALL standby Condensate/Booster Pump Sets blocked.
2. Auto transfer of 12KV Bus D **OR** Bus E blocked.
3. Both 12KV Buses D AND E unloaded.

Pacific Gas and Electric Company®

System Dispatch Instruction: O-23
Publication Date: [09/17/2018] Rev: 5.0

Operating Instruction for Reliable Transmission Service to Diablo Canyon Power Plant

Appendix 4 - TABLE 1

Table 1

230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip
[WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O-23 Rev	5.0	Last updated/revised:	6/21/18

All 230kV Lines in Service

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MAXIMUM Los Padres Load (MW)	Los Padres 230kV Operating Level (2,3,5,6) Level C (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
1-	1	2	4	1	227	715	225	740	1-	1
	2		3		227	680	225	710		2
	3		2		227	645	225	670		3
	4		1		227	600	224	635		4
	5		0		227	560	224	595		5
	6	1	4	1	226	690	223	720		6
	7		3		225	655	223	685		7
	8		2		225	620	223	645		8
	9		1		225	575	223	605		9
	10		0		225	535	223	565		10
	11	0	4	1	226	650	222	695		11
	12		3		224	625	222	610		12
	13		2		224	590	222	620		13
	14		1		224	545	222	580		14
	15		0		224	500	222	540		15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Single element outage * * ***

Morro Bay-Diablo Canyon 230kV Line

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
2-	1	2	4	1	229	475	229	535	2-	1
	2		3		234	425	229	480		2
	3		2		230	400	229	415		3
	4		1		229	345	229	345		4
	5		0		Not Functional		Not Functional			5
	6	1	4	1	229	410	229	480		6
	7		3		229	325	229	400		7
	8		2		Not Functional		229	330		8
	9		1		Not Functional		Not Functional			9
	10		0		Not Functional		Not Functional			10
	11	0	4	1	231	305	229	395		11
	12		3		Not Functional		229	325		12
	13		2		Not Functional		Not Functional			13
	14		1		Not Functional		Not Functional			14
	15		0		Not Functional		Not Functional			15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Single element outage * * ***

Morro Bay-Mesa 230kV Line

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
3-	1	2	4	1	229	560	-	-	3-	1
	2		3		231	535	-	-		2
	3		2		231	490	-	-		3
	4		1		231	440	-	-		4
	5		0		231	390	-	-		5
	6	1	4	1	229	550	-	-		6
	7		3		229	510	-	-		7
	8		2		229	460	-	-		8
	9		1		229	410	-	-		9
	10		0		229	360	-	-		10
	11	0	4	1	228	525	-	-		11
	12		3		228	480	-	-		12
	13		2		228	430	-	-		13
	14		1		228	380	-	-		14
	15		0		228	325	-	-		15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Single element outage * * ***

Morro Bay-Midway #1 230kV Path (7) (9)

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
5-	1	2	4	1	229	650	-	-	5-	1
	2		3		228	615	-	-		2
	3		2		228	575	-	-		3
	4		1		227	540	-	-		4
	5		0		227	500	-	-		5
	6	1	4	1	227	625	-	-		6
	7		3		227	590	-	-		7
	8		2		226	550	-	-		8
	9		1		226	510	-	-		9
	10		0		226	470	-	-		10
	11	0	4	1	225	600	-	-		11
	12		3		225	565	-	-		12
	13		2		225	525	-	-		13
	14		1		225	480	-	-		14
	15		0		224	435	-	-		15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Single element outage * * ***

Morro Bay-Midway #2 230kV Path (8) (9)

ROW # (X-Y)	Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)
6-1	2	4	1	229	650	-	-	6-1
6-2		3		228	615	-	-	6-2
6-3		2		228	575	-	-	6-3
6-4		1		227	540	-	-	6-4
6-5		0		227	500	-	-	6-5
6-6	1	4	1	227	625	-	-	6-6
6-7		3		227	590	-	-	6-7
6-8		2		226	550	-	-	6-8
6-9		1		226	510	-	-	6-9
6-10		0		226	470	-	-	6-10
6-11	0	4	1	225	600	-	-	6-11
6-12		3		225	565	-	-	6-12
6-13		2		225	525	-	-	6-13
6-14		1		225	480	-	-	6-14
6-15		0		224	435	-	-	6-15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Single element outage * * ***

Morro Bay-Gates 230kV Path(11)

[Use for Morro Bay-Cal Flats SS and/or Cal Flats SS-Gates 230kV line]

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
7-	1	2	4	1	229	585	-	-	7-	1
	2		3		230	570	-	-		2
	3		2		228	550	-	-		3
	4		1		228	510	-	-		4
	5		0		228	470	-	-		5
	6	1	4	1	230	570	-	-		6
	7		3		229	540	-	-		7
	8		2		227	520	-	-		8
	9		1		226	480	-	-		9
	10		0		226	440	-	-		10
	11	0	4	1	227	565	-	-		11
	12		3		226	530	-	-		12
	13		2		225	490	-	-		13
	14		1		225	450	-	-		14
	15		0		225	405	-	-		15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Single element outage * * ***

Morro Bay-Templeton 230kV Line

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
8-	1	2	4	1	231	705	-	-	8-	1
	2		3		229	675	-	-		2
	3		2		229	635	-	-		3
	4		1		228	590	-	-		4
	5		0		228	540	-	-		5
	6	1	4	1	228	690	-	-		6
	7		3		227	650	-	-		7
	8		2		227	610	-	-		8
	9		1		227	555	-	-		9
	10		0		226	510	-	-		10
	11	0	4	1	226	660	-	-		11
	12		3		226	620	-	-		12
	13		2		225	570	-	-		13
	14		1		225	525	-	-		14
	15		0		225	470	-	-		15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Dual element outage * * ***

Morro Bay-Mesa + Diablo-Mesa 230kV lines

[drops entire Mesa/Santa Maria area]

ROW # (X-Y)	Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)
10-1	2	4	1	-	-	-	-	10-1
10-2	2	3	1	-	-	-	-	10-2
10-3	2	2	1	-	-	-	-	10-3
10-4	2	1	1	-	-	-	-	10-4
10-5	2	0	1	232	330 [8]	-	-	10-5
10-6	1	4	1	-	-	-	-	10-6
10-7	1	3	1	-	-	-	-	10-7
10-8	1	2	1	-	-	-	-	10-8
10-9	1	1	1	-	-	-	-	10-9
10-10	1	0	1	232	330 [8]	-	-	10-10
10-11	0	4	1	-	-	-	-	10-11
10-12	0	3	1	-	-	-	-	10-12
10-13	0	2	1	-	-	-	-	10-13
10-14	0	1	1	-	-	-	-	10-14
10-15	0	0	1	232	330 [8]	-	-	10-15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Dual element outage * * ***

Morro Bay-Gates Path + Morro Bay-Templeton 230kV lines

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
11-	1	2	4	1	229	545	-	-	11-	1
	2		3		233	505	-	-		2
	3		2		229	490	-	-		3
	4		1		229	435	-	-		4
	5		0		229	375	-	-		5
	6	1	4	1	232	510	-	-		6
	7		3		230	475	-	-		7
	8		2		229	430	-	-		8
	9		1		229	370	-	-		9
	10		0		229	305	-	-		10
	11	0	4	1	230	470	-	-		11
	12		3		231	405	-	-		12
	13		2		231	355	-	-		13
	14		1		Not Functional		-	-		14
	15		0		Not Functional		-	-		15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Dual element outage * * ***

Morro Bay-Gates Path + Templeton-Gates 230kV lines

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
12-	1	2	4	1	229	430	-	-	12-	1
	2		3		229	390	-	-		2
	3		2		233	355	-	-		3
	4		1		230	340	-	-		4
	5		0		Not Functional		-	-		5
	6	1	4	1	229	385	-	-		6
	7		3		232	360	-	-		7
	8		2		229	345	-	-		8
	9		1		Not Functional		-	-		9
	10		0		Not Functional		-	-		10
	11	0	4	1	229	345	-	-		11
	12		3		231	330	-	-		12
	13		2		Not Functional		-	-		13
	14		1		Not Functional		-	-		14
	15		0		Not Functional		-	-		15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip
[WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Dual element outage * * ***

Morro Bay-Midway #1 + Morro Bay-Midway #2 Path

[adjacent sections of both lines Out of Service]

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
13-	1	2	4	1	229	455	-	-	13-	1
	2		3		230	445	-	-		2
	3		2		229	415	-	-		3
	4		1		229	365	-	-		4
	5		0		229	315	-	-		5
	6	1	4	1	230	445	-	-		6
	7		3		229	410	-	-		7
	8		2		229	365	-	-		8
	9		1		229	310	-	-		9
	10		0		Not Functional		-	-		10
	11	0	4	1	229	410	-	-		11
	12		3		229	365	-	-		12
	13		2		229	310	-	-		13
	14		1		Not Functional		-	-		14
	15		0		Not Functional		-	-		15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Dual element outage * * ***

Loss of Morro Bay 230kV bus 1E

[Loss of Both Morro Bay-Solar SS #1 + Morro Bay-Diablo 230kV lines]

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
14-	1	2	4	1	229	450	-	-	14-	1
	2		3		229	385	-	-		2
	3		2		233	345	-	-		3
	4		1		Not Functional		-	-		4
	5		0		Not Functional		Not Functional			5
	6	1	4	1	229	385	-	-		6
	7		3		229	315	-	-		7
	8		2		Not Functional		-	-		8
	9		1		Not Functional		Not Functional			9
	10		0		Not Functional		Not Functional			10
	11	0	4	1	Not Functional		-	-		11
	12		3		Not Functional		-	-		12
	13		2		Not Functional		Not Functional			13
	14		1		Not Functional		Not Functional			14
	15		0		Not Functional		Not Functional			15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Dual element outage * * ***

Loss of Morro Bay 230kV bus 2E

[Loss of Both Morro Bay-Solar SS #2 + Morro Bay-Mesa 230kV lines]

ROW # (X-Y)		Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)	
15-	1	2	4	1	229	520	-	-	15-	1
	2		3		229	475	-	-		2
	3		2		229	430	-	-		3
	4		1		229	380	-	-		4
	5		0		231	345	-	-		5
	6	1	4	1	229	480	-	-		6
	7		3		229	430	-	-		7
	8		2		229	380	-	-		8
	9		1		229	325	-	-		9
	10		0		229	315	-	-		10
	11	0	4	1	229	480	-	-		11
	12		3		228	435	-	-		12
	13		2		228	385	-	-		13
	14		1		228	335	-	-		14
	15		0		Not Functional		-	-		15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

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230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Abnormal system configuration * * ***

Diablo Canyon 230kV Buses Split

ROW # (X-Y)	Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MAXIMUM Los Padres Load (MW)	Los Padres 230kV Operating Level (2,3,5,6) Level C (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)
16	See "All 230kV Lines in Service" or applicable line(s) outage							16

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

Notes on page 19 of Table 1

Pacific Gas and Electric Company®

System Dispatch Instruction: O-23
Publication Date: [09/17/2018] Rev: 5.0

Operating Instruction for Reliable Transmission Service to Diablo Canyon Power Plant

Appendix 4 - TABLE 1

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Table 1

230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Abnormal system configuration * * ***

Templeton 230kV Bus Split (Scenario #1)

[Templeton TB #1 fed solely from Morro Bay]

ROW # (X-Y)	Capacitors (10) Maximum Number IN [available or inserted]		MINIMUM number of Xfrms in service	Los Padres 230kV Operating Level (2,3,5,6)				ROW # (X-Y)
				Normal (4)		Level C (4)		
	DCPP	Mesa	Mesa	MINIMUM DCPP 230 kV bus Voltage	MAXIMUM Los Padres Load (MW)	MINIMUM DCPP 230 kV bus Voltage	MAXIMUM Los Padres Load (MW)	
17-1	2	4	1	229	605	-	-	17-1
17-2	2	3	1	229	560	-	-	17-2
17-3	2	2	1	229	510	-	-	17-3
17-4	2	1	1	229	470	-	-	17-4
17-5	2	0	1	228	490	-	-	17-5
17-6	1	4	1	230	595	-	-	17-6
17-7	1	3	1	229	560	-	-	17-7
17-8	1	2	1	227	540	-	-	17-8
17-9	1	1	1	227	500	-	-	17-9
17-10	1	0	1	226	455	-	-	17-10
17-11	0	4	1	226	590	-	-	17-11
17-12	0	3	1	226	550	-	-	17-12
17-13	0	2	1	225	510	-	-	17-13
17-14	0	1	1	225	470	-	-	17-14
17-15	0	0	1	225	425	-	-	17-15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

Notes on page 19 of Table 1

Pacific Gas and Electric Company®

System Dispatch Instruction: O-23
Publication Date: [09/17/2018] Rev: 5.0

Operating Instruction for Reliable Transmission Service to Diablo Canyon Power Plant

Appendix 4 - TABLE 1

Table 1

230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

*** * * Abnormal system configuration * * ***

Templeton 230kV Bus Split (Scenario #2)

[Templeton TBs #1 & #2 fed solely from Morro Bay]

ROW # (X-Y)	Capacitors (10) Maximum Number IN [available or inserted] DCPP	Capacitors (10) Maximum Number IN [available or inserted] Mesa	MINIMUM number of Xfrms in service Mesa	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MINIMUM DCPP 230 kV bus Voltage	Los Padres 230kV Operating Level (2,3,5,6) Normal (4) MAXIMUM Los Padres Load (MW)	Level C (4) MINIMUM DCPP 230 kV bus Voltage	Level C (4) MAXIMUM Los Padres Load (MW)	ROW # (X-Y)
18-1	2	4	1	229	580	-	-	18-1
18-2	2	3	1	231	560	-	-	18-2
18-3	2	2	1	229	540	-	-	18-3
18-4	2	1	1	228	510	-	-	18-4
18-5	2	0	1	228	470	-	-	18-5
18-6	1	4	1	229	575	-	-	18-6
18-7	1	3	1	227	555	-	-	18-7
18-8	1	2	1	227	520	-	-	18-8
18-9	1	1	1	226	480	-	-	18-9
18-10	1	0	1	226	440	-	-	18-10
18-11	0	4	1	226	565	-	-	18-11
18-12	0	3	1	226	530	-	-	18-12
18-13	0	2	1	225	490	-	-	18-13
18-14	0	1	1	225	455	-	-	18-14
18-15	0	0	1	225	410	-	-	18-15

IMPORTANT: Contact DCPP within 10 minutes when real-time system conditions move to new row.

Notes on page 19 of Table 1

Pacific Gas and Electric Company®

System Dispatch Instruction: O-23
Publication Date: [09/17/2018] Rev: 5.0

Operating Instruction for Reliable Transmission Service to Diablo Canyon Power Plant

Appendix 4 - TABLE 1

Table 1

230kV Configurations and Associated Constraints To Accommodate Dual Unit Trip [WITHOUT utilizing Morro Bay Bus Bypass Breaker (CB 562)]

O23 Rev	5.0	Last updated/revised:	6/21/18

Notes for Table 1

1 Both DCPP Units Off-line (i.e. no generation)

2 DCPP 230kV Baseline/Pre-trip Load:

	Light Load	V= 230kV
MW=	4.0	
MVAR=	3.5	

3 Grid Conditions prior to adding DCPP post-trip incremental load

4 DCPP 230kV Post Trip Levels

Incremental Load added to grid:	Level	MW	MVAR	MVA	Pf
	Normal	90.0	67.5	113.0	0.80
	Level A	- - -	- - -	- - -	- - -
	Level B	- - -	- - -	- - -	- - -
	Level C	70.0	52.5	88.0	0.80

5 Grid Operating Limits to ensure at least 207kV post-trip voltage on local 230kV system and remain compliant with DCPP NPIRs

6 For transmission operating conditions or configurations other than those described in this table, the utility Operations Engineering Dept and DCPP Design Engineering Dept should coordinate and confirm new/updated limits.

7 Used when **ANY** line section of the #1 circuit of the Morro Bay-Solar SS-Caliente SS-Midway path is Out Of Service (OOS)

8 Used when **ANY** line section of the #2 circuit of the Morro Bay-Solar SS-Caliente SS-Midway path is Out of Service (OOS).

9 Used when this path has the Out Of Service section **closest** to Morro Bay during multiple (non-adjacent) line outages

10 IN = Capacitor manually inserted or under control of AVC (Automatic Voltage Controller)

11 Used when EITHER line section of the Morro Bay-Gates 230kV path is Out of Service (OOS).

230-kV Operability Determination Worksheet **U1&2 Attachment 4: Page 1 of 1**

NOTE:	Steady state voltages should be used for this worksheet and should disregard momentary grid transients.

Date/Time _____/_____

Unit/Mode _____/_____

Switchyard Data (See Attachment 3)

Line Outage(s) _____

Capacitors

DCPP _____ AVAILABLE or IN (number)

MESA _____ AVAILABLE or IN (number)

MESA Transformers In Service _____ (1 or 2)

Row Number (X-Y) ____ — ____

230-kV Voltage at Switchyard

Minimum req'd _____ kV

Actual _____ kV

Los Padres Area Load

Maximum Allowed _____ mW

Actual _____ mW

Control Room Data

DCPP Electrical Configuration (Attachment 1) _____ (1 = backfeed, 2 = transfer, 3 = power)

Load Transfer Level _____ (Normal, C)

LTC Status _____ (AUTO, MANUAL)

52VU11 Status _____ (OPEN, CLOSED)

Comp actions, if required _____

SCADA Data Monitoring _____ (Hourly/ Shiftly)

Radial Feed DGs Protected _____ (Yes, No)

3.8 ELECTRICAL POWER SYSTEMS

3.8.1 AC Sources - Operating

LCO 3.8.1 The following AC electrical sources shall be OPERABLE:

a. Two qualified circuits between the offsite transmission network and the onsite Class 1E AC Electrical Power Distribution System; and

b. Three diesel generators (DGs) capable of supplying the onsite Class 1E power distribution subsystem(s); and

c. Two supply trains of the diesel fuel oil (DFO) transfer system.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

----------NOTE----------
LCO 3.0.4b is not applicable to DGs.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. One required offsite circuit inoperable.	A.1	Perform SR 3.8.1.1 for required OPERABLE offsite circuit.	1 hour AND Once per 8 hours thereafter.
	AND		
	A.2	Restore required offsite circuit to OPERABLE status.	72 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. One DG inoperable.	B.1	Perform SR 3.8.1.1 for the required offsite circuit(s).	1 hour AND Once per 8 hours thereafter.
	AND		
		----------NOTE---------- In MODE 1, 2, and 3, TDAFW pump is considered a required redundant feature. ----------	
	B.2	Declare required feature(s) supported by the inoperable DG inoperable when its required redundant feature(s) is inoperable.	4 hours from discovery of Condition B concurrent with inoperability of redundant required feature(s).
	AND		
	B.3.1	Determine OPERABLE DG(s) is not inoperable due to common cause failure. OR	24 hours
	B.3.2	Perform SR 3.8.1.2 for OPERABLE DG(s).	24 hours
	AND		
	B.4	Restore DG to OPERABLE status.	14 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
C. Two required offsite circuits inoperable.	C.1 Declare required feature(s) inoperable when its redundant required feature(s) is inoperable. AND C.2 Restore one required offsite circuit to OPERABLE status.	12 hours from discovery of Condition C concurrent with inoperability of redundant required features. 24 hours
D. One required offsite circuit inoperable. AND One DG inoperable.	D.1 Restore required offsite circuit to OPERABLE status. OR D.2 Restore DG to OPERABLE status.	12 hours 12 hours
E. Two or more DGs inoperable.	E.1 Ensure at least two DGs are OPERABLE.	2 hours
F. One supply train of the DFO transfer system inoperable.	F.1 Restore the DFO transfer system to OPERABLE status.	72 hours
G. Two supply trains of the DFO transfer system inoperable.	G.1 Restore one train of the DFO transfer system to OPERABLE status.	1 hour
H. Required Action and associated Completion Time of Condition A, B, C, D, E, F or G not met.	H.1 Be in MODE 3. AND H.2 ----------NOTE---------- LCO 3.0.4.a is not applicable when entering MODE 4. ---------- Be in MODE 4.	6 hours 12 hours

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
I. Two or more DGs inoperable. AND One or more required offsite circuits inoperable.	I.1 Enter LCO 3.0.3.	Immediately
J. One or more DGs inoperable. AND Two required offsite circuits inoperable.	J.1 Enter LCO 3.0.3.	Immediately

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-A8

Title: Authorize Emergency Exposure

Examinee: _____

Evaluator: _____ _____ _____

Print Signature Date

Testing Method: Perform ___X___ Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: Designed for SRO candidates in a classroom setting.

References: EP RB-2 Emergency Exposure Guidelines, Rev 8.

Alternate Path: Yes _____ No ___X___

Time Critical: Yes _____ No ___X___

Time Allotment: 10 minutes

Critical Steps: See Examinee Response Key

Job Designation: SRO

Rev Comments Modified Bank

Gen KA # G2.3.4 – Knowledge of radiation exposure limits under normal or emergency conditions. 3.7

AUTHOR: LISA TORIBIO DATE: 12/03/19

OPERATIONS REPRESENTATIVE: CHRISTOPHER MEHIGAN DATE: 12/04/19

Directions: All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the step at which to begin.

Required Materials:
- EP RB-2 Emergency Exposure Guidelines, Rev 8.
- Completed Emergency Exposure Permits for volunteers (Handout 1)

Initial Conditions: GIVEN:
- Both Units were operating at 100% power when a large seismic event occurred resulting in a faulted/ruptured steam generator (S/G 1-3) on Unit 1.
- There is evidence of fuel damage.
- MSIV FCV-43 has failed open and a break downstream of the MSIV is causing S/G 1-3 to blow down in the 115' pen area.
- The Shift Manager has declared a general emergency, FG1.1, for the loss of all three fission product barriers.
- Volunteers have been found to undertake two high priority emergency field activities and the Site Radiation Protection Coordinator has forwarded their associated Emergency Exposure Permits for SEC approval.

Initiating Cue:
- The Shift Manager directs you to review each completed permit and determine whether or not it should be approved.
- Document your recommendations as well as their basis in the space provided below before reporting out

NOTE:
- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references. .

Task Standard:	**DO NOT READ TASK STANDARD TO EXAMINEE** • Wayne permit should be authorized – permit request is for 4.5 REM, and maximum for allowable for sampling is 5 REM. • Banner permit should **NOT** be authorized – Voluntary consent signature line is marked N/A. Voluntary consent signature IS required for a NO LIMIT exposure authorization.

Start Time: _____ **End Time:** _____

Follow-up Question Documentation:

Question: _____

_____

_____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

Examinee Response - KEY		
Volunteer	**Approve?**	**Basis for Approval or Rejection**
Wayne	**YES**	**Requested permit limit is within the allowable range of the associated activity type.** (Permit request is for 4.5 REM, which is within the limits allowable for sampling).
Banner	**NO**	**Requested NO LIMIT exposure is allowable for the associated activity type, but the volunteer's signature line is incorrectly marked N/A. Volunteer signature is required to acknowledge he/she is fully aware of the risks.** (Permit request is for a life-saving activity, but is missing the volunteer's signature).

Initial Conditions: GIVEN:

- Both Units were operating at 100% power when a large seismic event occurred resulting in a faulted/ruptured steam generator (S/G 1-3) on Unit 1.
- There is evidence of fuel damage.
- MSIV FCV-43 has failed open and a break downstream of the MSIV is causing S/G 1-3 to blow down in the 115' pen area.
- The Shift Manager has declared a general emergency, FG1.1, for the loss of all three fission product barriers.
- Volunteers have been found to undertake two high priority emergency field activities and the Site Radiation Protection Coordinator has forwarded their associated Emergency Exposure Permits for SEC approval.

Initiating Cue:

- The Shift Manager directs you to review each completed permit and determine whether or not it should be approved.
- Document your recommendations as well as their basis in the space provided below before reporting out.

EXAMINEE RESPONSE		
Volunteer	**Approve?**	**Basis for Approval or Rejection**
Wayne		
Banner		

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.7

1 AND 2

TITLE: Emergency Exposure Permit

Date: TODAY Time: 08:36 Permit #: 16-090A

Responder(s): Bruce Wayne
(Print)

RP Support: S. Witt

Description of Activity: Perform sampling of all steam generators per CAP AP-1 as called for by EOP E-3, Appendix FF, step 9.

Special Hazards: Condition of sampling system unknown. Structural damage in area.

Special Instructions: Contact Control Room at x1224 when prepared to commence sampling.

Anticipated TEDE Rate: 4.5 (rem/hr)

Anticipated Stay Time: 1.0 (hr)

Anticipated TEDE: 4.5 (rem)

AUTHORIZED LIMIT: (Check One)
[X] 5 rem TEDE
[ ] 10 rem TEDE
[ ] 25 rem TEDE
[ ] **NO LIMIT**

*Voluntary Consent (For potential exposures of ≥ 25 rem TEDE): I hereby volunteer to perform the activity described above and I acknowledge having received a radiological briefing. I am fully aware of the health risks associated with the anticipated exposure. (Sign Below.)

N/A

Authorization of SM or SEC or Emergency Director: Time:

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.7

1 AND 2

TITLE: Emergency Exposure Permit

Date: TODAY Time: 09:00 Permit #: 16-090B

Responder(s): Bruce Banner
(Print)

RP Support: D. Libby

Description of Activity: Operator with fractured leg and head contusion trapped within 100' pipe nest SCA. The individual appears to be having significant difficulty breathing. Volunteer has EMT background; will move Operator to low dose area for further evaluation.

Special Hazards: Exposed Electical

Special Instructions: SCA Boundaries will be relocated as needed to support rescue efforts. Second volunteer on standby.

Anticipated TEDE Rate: 20 (rem/hr)

Anticipated Stay Time: 1.3 (hr)

Anticipated TEDE: 26.0 (rem)

AUTHORIZED LIMIT: (Check One)
[ ] 5 rem TEDE
[ ] 10 rem TEDE
[ ] 25 rem TEDE
[X] **NO LIMIT**

*Voluntary Consent (For potential exposures of ≥ 25 rem TEDE): I hereby volunteer to perform the activity described above and I acknowledge having received a radiological briefing. I am fully aware of the health risks associated with the anticipated exposure. (Sign Below.)

N/A

Authorization of SM or SEC or Emergency Director: Time:

TITLE: Emergency Exposure Guides

1 AND 2

INFO ONLY
EFFECTIVE DATE

PROCEDURE CLASSIFICATION: QUALITY RELATED

TABLE OF CONTENTS

1. SCOPE{TC "SCOPE" \F C \L 1}

1.1 This procedure provides guidance in the process of determining the need for authorizing and controlling emergency radiological exposure to selected individuals that is beyond the 10 CFR 20 annual exposure limits.

2. DISCUSSION{TC "DISCUSSION" \F C \L 1}

2.1 Authorization of emergency exposure is an extraordinary measure, but justifiable under four sets of circumstances.

When the intended action requiring a potential overexposure to an emergency worker, is expected to result in;

- Saving or preserving the quality of a human life that would otherwise be lost
- Significant projected dose saving to others
- Protection of valuable property
- Sampling results required to redefine or adjust existing Protective Actions for the public or site personnel

All of the above situations require that no reasonable method is immediately available (or readily apparent) to avoid exceeding the established annual limits and that every effort will be made to keep the emergency exposure ALARA.

2.2 The emergency exposure guidelines implemented at DCPP are consistent with the Environmental Protection Agency (EPA) guidance for controlling doses to workers under emergency conditions.[Ref 10.11]

2.3 Authorized dose limits for workers during emergencies are based on avoiding acute health effects and limiting the risk of delayed health effects.

2.4 Emergency worker exposures are not controlled by Planned Special Exposures.

NOTE: Planned Special Exposures may be implemented during non-emergency situations including Recovery Operations. Refer to RP1.ID8, "Planned Special Exposure."

2.5 An emergency exposure should be authorized only once in an individual's lifetime and is in addition to any prior occupational exposure from normal or planned special exposures.

2.6 The emergency exposure limits specified in this procedure are applicable to both in-plant team response activities and off-site field monitoring by the company's ERO personnel.

2.7 Emergency exposure above 25 rem TEDE shall require the voluntary consent of the authorized individual.

2.8 All references and instructions for the Emergency Director and Site Emergency Coordinator in this procedure also apply to the Shift Manager while he/she has command and control over the emergency event.

2.9 Nothing in this procedure shall be construed as limiting actions that may be necessary to protect health and safety.

3. DEFINITIONS{TC "DEFINITIONS" \F C \L 1}

3.1 Annual Administrative Exposure Guidelines: An administrative dose restriction for individual occupational radiation exposure established by the company to control personnel exposures within non-regulatory recommendations recommended by NCRP and ICRP.

3.2 Annual Administrative Exposure Limits: Dose limits established by the company to ensure that personnel do not exceed regulatory limits.

3.3 Committed Dose Equivalent (CDE): The dose to the organs or tissues that would be received from an intake of radioactive material by an individual during the 50 years following the intake.

3.4 Committed Effective Dose Equivalent (CEDE): The sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the CDE to these organs or tissues.

3.5 Corrective Actions: Those emergency measures taken to mitigate or terminate an emergency situation at or near the source of the problem in order to prevent an uncontrolled release of radioactive material or reduce the magnitude of a release.

3.6 Declared Pregnant Woman (DPW): A woman who has voluntarily informed her supervision, in writing, of her pregnancy and the estimated date of conception.

3.7 Deep Dose Equivalent (DDE): Dose associated with external exposure of the whole body at a depth of 1 cm.

3.8 Effective Dose Equivalent (EDE): For external radiation exposure, EDE is the sum of the product of the deep dose equivalent for each whole body compartment time the compartment's weighting factor.

3.9 Lens Dose Equivalent (LDE): External exposure to the lens of the eye at a depth 0.3 cm.

3.10 Lifesaving Action: Any of several activities that are necessary to save human life including search and rescue, first aid, transport and emergency medical care.

3.11 Occupational Dose: Dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation and to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person.

3.12 Personal Electronic Dosimeter (PED): A PED is a specific type of SRD. The PED is the most commonly used SRD at DCPP. This dosimeter has a digital display and is set to alarm at RWP dependent dose and dose rate values.

3.13 Planned Special Exposure: Dose received in addition to and accounted for separately from the doses received under the limits of 10 CFR 20.1201 as a planned and specially authorized exposure in accordance with 10 CFR 20.1206.

3.14 Shallow Dose Equivalent (SDE): External exposure of the skin or any extremity (depth 0.007 cm).

3.15 Total Effective Dose Equivalent (TEDE): TEDE is the sum of EDE (for external exposures) and CEDE (for internal exposures).

3.16 Total Organ Dose Equivalent (TODE): TODE is the sum of EDE (for external exposures) and CDE (for internal exposures).

4. RESPONSIBILITIES{TC "RESPONSIBILITIES" \F C \L 1}

4.1 The PG&E person with command and control of emergency response, (The Emergency Director (ED), Site Emergency Coordinator (SEC) prior to turnover or Shift Manager (SM) prior to turnover), has the unilateral authority and non-delegable responsibility for authorizing an individual emergency worker to exceed normal 10 CFR 20 exposure limits.

4.1.1 The ED/SEC is furthermore responsible for ensuring that the NRC is notified of any overexposure that may result.

4.2 The TSC Radiological Advisor (RA) is responsible for evaluating the conditions requiring an emergency exposure authorization and advising the ED (or SEC) on its justification and when all prerequisite requirements have been met.

4.3 The EOF Radiological Manager (RM) is responsible for evaluating radiological conditions and exposures to off-site emergency response personnel and advising the ED when an emergency exposure authorization is justified.

4.4 The Site Radiation Protection Coordinator (SRPC) is responsible for identifying the necessity of obtaining an emergency exposure authorization and in assisting with volunteer selection as needed.

4.5 The OSC Director (OD) is responsible for ensuring that the maximum protection and support is provided to those personnel dispatched from the OSC under the extraordinary conditions of emergency exposure.

4.6 The emergency worker is responsible for knowing the potential health consequences of the emergency exposure and for signing the Emergency Exposure Permit when volunteering for potential emergency exposures of $\geq$ 25 Rem TEDE.

4.6.1 The emergency worker is responsible for maintaining his/her emergency exposure ALARA consistent with the successful completion of the emergency activity.

5. PREREQUISITES{TC "PREREQUISITES" \F C \L 1}

5.1 Emergency classification of Alert or higher has been declared.

5.2 An essential emergency action is required (refer to Attachment 9.6) and cannot be performed without one or more workers potentially exceeding 10 CFR 20 annual exposure limits.

6. PRECAUTIONS{TC "PRECAUTIONS" \F C \L 1}

6.1 Selection of volunteers shall be based upon established criteria and on the specific skills and knowledge of the workers needed to successfully complete the activity.

6.2 Individuals shall not be authorized to enter any area where exposure rates are unknown or beyond the highest range of portable monitoring instruments.

6.3 Any individual who receives (or is suspected to have received) an actual overexposure shall be removed from further participation in the emergency response.

6.4 Those personnel receiving a dose of 25 rem TEDE or greater shall be promptly transported off-site for evaluation by appropriate medical personnel.

6.5 An Emergency Exposure Authorization considers only the radiological hazards involved. Other potential hazards to health (i.e., heat stress, hazardous chemicals, biological hazards, confined space entry, etc.) shall be taken into consideration as well and shall be explained to the emergency workers prior to dispatching the team.

7. INSTRUCTIONS{TC "INSTRUCTIONS" \F C \L 1}

NOTE 1: Emergency exposure authorization is specific to each volunteer (individually) for performing the specific activity authorized. Any changes in the specific conditions that established the basis for the authorization are not valid until approved by both the volunteer(s) (for potential emergency exposures $\geq$ 25 Rem TEDE) and the ED/SEC/SM.

NOTE 2: Individual voluntary emergency exposure should be limited to once in a lifetime.

7.1 The Emergency Director (Shift Manager or Site Emergency Coordinator) shall implement Attachment 9.1 of this procedure.

7.2 The TSC Radiological Advisor (RA) shall implement Attachment 9.2 of this procedure.

7.3 The OSC Site Radiation Protection Coordinator (SRPC) shall implement Attachment 9.3 of this procedure.

7.4 The OSC Director shall implement Attachment 9.4 of this procedure.

7.5 The EOF Radiological Manager (RM) shall implement Attachment 9.5 of this procedure.

8. RECORDS{TC "RECORDS" \F C \L 1}

8.1 All records generated by the utilization of this procedure for an exercise or emergency shall be forwarded the next working day to the Emergency Planning Manager, for review and retention.

8.1.1 Completed forms and documents generated during drills are non-quality related records and shall be retained a minimum of 3 years in accordance with AD10.ID2.

8.1.2 Completed forms and documents generated during real events are quality related records and shall be retained per AD10.ID1.

9. ATTACHMENTS{TC "ATTACHMENTS" \F C \L 1}

9.1 Form 69-20628, "Emergency Director (SEC or SM) Checklist," 07/20/10Form {tc "Emergency Director (SEC or SEC) Checklist" \f C \l 2}

9.2 Form 69-20629, "TSC Radiological Advisor Checklist," 07/20/10{tc "TSC Radiological Advisor Checklist" \f C \l 2}

9.3 Form 69-20630, "OSC Site Radiation Protection Coordinator Checklist," 07/20/10{tc "OSC Site Radiation Protection Coordinator Checklist" \f C \l 2}

9.4 Form 69-20631, "OSC Emergency Maintenance Coordinator OSC Director Checklist," 07/20/10{tc "OSC Director Checklist" \f C \l 2}

9.5 Form 69-20632, "EOF Radiological Manager Checklist," 07/20/10{tc "EOF Radiological Manager Checklist" \f C \l 2}

9.6 "DCPP Emergency Exposure Guidelines," 07/20/10{tc "DCPP Emergency Exposure Guidelines" \f C \l 2}

9.7 Form 69-10554, "Emergency Exposure Permit," 05/06/09{tc "Emergency Exposure Permit" \f C \l 2}

10. REFERENCES{TC "REFERENCES" \F C \L 1}

10.1 CP M-13, "Personnel Injury (or Illness) with Radioactive Contamination or Personnel Overexposure"

10.2 EP EF-1, "Activation and Operation of the Technical Support Center"

10.3 EP EF-2, "Activation and Operation of the Operational Support Center"

10.4 EP EF-3, "Activation and Operation of the Emergency Operations Facility"

10.5 EP G-2, "Activation and Operation of the Interim Site Emergency Organization"

10.6 EP RB-1, "Personnel Dosimetry"

10.7 EP RB-3, "Stable Iodine Thyroid Blocking"

10.8 RP1.ID6, "Personnel Dose Limits and Monitoring Requirements"

10.9 NUREG-0737, November 1980

10.10 Title 10, Code of Federal Regulations, Part 20

10.11 "Manual of Protective Actions for Nuclear Incidents," USEPA, 400-R-92-001, May 1992

TITLE: Emergency Director (SEC or SM) Checklist

Actions	Initial

NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 rem TEDE) during an Alert or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.

1. INITIAL ACTIONS

   Review the completed Emergency Exposure Permit, form 69-10554, with the RA (or RM) and evaluate the justification for authorization.

   1.1 Ensure volunteers (if necessary) have been obtained and thoroughly briefed on the potential health consequences of this exposure. (See Criteria in Attachment 9.3) _____

   1.2 Ensure emergency activity is necessary (no reasonable alternatives) and can be successful in outcome. _____

   1.3 Ensure special hazards have been identified and protective measures implemented. _____

   1.4 Direct the OSC Director to establish a back-up team of volunteers for rotation, relief, or rescue if very high dose rates or other life threatening conditions are applicable. _____

   1.5 Implement EP RB-3, "Stable Iodine Thyroid Blocking," and direct the RA to administer KI distribution, if needed. _____

   1.6 Sign the permit to approve the Authorized Limit. (Refer to Attachment 9.6 for Exposure Limits.) LOG

   NOTE: Each permit is specific to the individuals or volunteers identified and specified activity. Any changes or additions require a new authorization.

2. SUBSEQUENT ACTIONS

   2.1 Direct the Administrative Advisor in the TSC to callout anticipated replacement personnel for the potentially overexposed volunteers. _____

   2.2 Ensure other emergency measures taken concurrently do not increase the accepted risks to the volunteers or jeopardize a successful outcome. _____

   2.3 Ensure overexposed personnel are promptly transported to off-site medical facilities for evaluation and treatment. (Refer to CP M-13.) _____

   2.4 Ensure that the NRC is notified immediately in accordance with 10 CFR 20.2202(a) for any individual exposure of ≥ 25 rem TEDE, ≥ 250 rad SDE, or ≥ 75 rem LDE. _____

TITLE: TSC Radiological Advisor Checklist

Actions	Initial

NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 rem TEDE) during an ALERT or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.

1. INITIAL ACTIONS

Obtain a copy of Emergency Exposure Permit, Form 69-10554, from the OSC and confirm it's completeness by contacting the SRPC – a "faxed" copy is acceptable.

1.1 Volunteers (if needed) have been obtained and thoroughly briefed on the potential health consequences of this exposure. (See Criteria in Attachment 9.3.) _____

1.2 Emergency activity is necessary (no reasonable alternatives) and can be successful in outcome. _____

1.3 Ensure special hazards have been identified and protective measures implemented. _____

1.4 Recommend a back-up team to be assembled and standing by if very high dose rates are anticipated. _____

1.5 Obtain authorization from the ED/SEC/SM for Thyroid Blocking Agent per EP RB-3, if necessary. _____

1.6 Evaluate justification for the Authorized Limit and advise the ED/SEC/SM to authorize the permit. (Refer to Attachment 9.6 for Exposure Limits.) _____

NOTE: TEDE exposure is the controlling limit for continuous monitoring of the team. Other exposures (SDE, LDE, and CDE+DDE) require appropriate protective measures (i.e., KI, respirator use, clothing, etc.) and are important for planning purposes only, unless capability of direct monitoring exists.

1.7 Determine any appropriate Dose Correction Factors to adjust the Authorized TEDE Limit if conditions indicate that other doses are more likely to be limiting and notify the SRPC. _____

EP RB-2 (UNITS 1 AND 2)
ATTACHMENT 9.2

TITLE: TSC Radiological Advisor Checklist

	Actions	Initial
2.	SUBSEQUENT ACTIONS	
2.1	Notify SRPC that ED/SEC/SM authorization has been obtained and provide any special instructions, conditions or revised limits, if needed.	_____
2.2	Direct SRPC to prepare a Radiation Work Permit (RWP), if not already done.	_____
	NOTE: If the situation requires immediate action the RWP may be completed afterward, but verbal authorization is required beforehand.	
2.3	Ensure that CP M-13, "Personal Injury (or Illness) with Radioactive Contamination or Personnel Overexposure," is implemented in anticipation of overexposed personnel.	_____
2.4	Implement EP RB-3, "Stable Iodine Thyroid Blocking," as directed by the ED/SEC/SM.	_____
2.5	Implement EP RB-1, "Personnel Dosimetry," to ensure that;	_____
	• adequate personnel exposure monitoring is provided for the extraordinary conditions	
	• dosimetry devices are collected and dose evaluated promptly after task completion	
	• dosimetry incidents (off-scale or erratic readings) are evaluated promptly	

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.3

1 AND 2

TITLE: OSC Site Radiation Protection Coordinator Checklist

Actions	Initial

NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 rem TEDE) during an ALERT or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.

1. INITIAL ACTIONS

When a pre-departure analysis of radiological conditions, in accordance with EP EF-2, indicates that the planned or anticipated dose to any emergency response team member will exceed 10 CFR 20 annual limits, perform the following;

1.1 Review your dose evaluation with the OSC Director and the affected Unit Shift Foreman as applicable to determine if any alternative actions can achieve the desired results without requiring an emergency exposure. _____

1.2 Obtain qualified volunteers (if needed) from those personnel available. (Criteria in Section 3.0, next page) _____

1.3 Obtain a working copy of form 69-10554, Emergency Exposure Permit (Attachment 9.7), and fill in the required information. _____

NOTE: Complete a new permit form for each team activity that is analyzed to require emergency exposure. _____

1.4 Calculate and record the anticipated exposure to the most limiting team member and determine the authorized limit appropriate to the activity in accordance with Attachment 9.6, DCPP Emergency Exposure Guidelines. _____

1.5 Brief the volunteers on the radiological hazards and ensure they are informed about the potential health consequences associated with authorized exposure. _____

1.6 For potential exposures of $\geq$ 25 Rem TEDE, obtain the signature on the Emergency Exposure Permit of each volunteer, including the C&RP technician assigned to monitor the team. _____

1.7 Obtain authorization from the ED/SEC/SM for Thyroid Blocking Agent per EP RB-3, if necessary. _____

1.8 FAX the completed form to the Emergency Director (or SEC if EOF is not activated) and contact the RA to review the Permit and advise the ED/SEC. _____

EP RB-2 (UNITS 1 AND 2)
ATTACHMENT 9.3

TITLE: OSC Site Radiation Protection Coordinator Checklist

Actions	Initial

2. SUBSEQUENT ACTIONS

When the emergency exposure authorization is approved by the ED/SEC/SM, then ensure that all conditions and limitations are understood by the response team prior to departure in accordance with EP EF-2 and RWP documentation requirements.

With regard to the extraordinary circumstances of this activity ensure that the following additional actions are taken;

2.1 Ensure that appropriate personnel dosimetry is issued in accordance with EP RB-1, "Personnel Dosimetry." _____

2.2 Ensure that a portable radiation monitoring instrument with adequate range capability is supplied to the C&RP Technician. _____

****

CAUTION: IT IS FORBIDDEN TO ENTER ANY AREA WHERE THE DOSE RATES ARE UNKNOWN OR BEYOND THE RANGE OF INSTRUMENTATION AVAILABLE.

****

2.3 Ensure that the Team Leader understands that whenever practical (without compromising the mission) ALARA principles should be used to minimize team exposure. _____

NOTE: If the situation requires immediate action, the RWP may be completed afterward, but verbal authorization is required beforehand.

3. CRITERIA FOR VOLUNTEER SELECTION

3.1 Professional rescue personnel for lifesaving activities who volunteer by choice of employment should be chosen for search and rescue.

3.2 RCA Qualified personnel should be selected for missions involving very high dose rates and high contamination levels.

3.3 Volunteers shall be fully aware of the risks involved.

3.4 Volunteers should be above the age of 45 years old.

3.5 Declared Pregnant Women (DPW) shall NOT be chosen.

3.6 Individuals who have already received an emergency exposure should NOT be chosen.

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.4 **1 AND 2**

TITLE: OSC Emergency Maintenance Coordinator OSC Director Checklist

	Actions	Initial
1.	INITIAL ACTIONS	
	When a pre-departure analysis of radiological conditions, in accordance with EP EF-2, indicates that the planned or anticipated dose to the emergency response team members will exceed 10 CFR 20 annual limits, perform the following;	
1.1	Contact the Operations Coordinator and the SEC to determine if any alternative actions can achieve the desired results without requiring an emergency exposure.	_____
	Consideration may be given to any one or combination of the following possible alternatives and should be pursued in parallel, as time permits to avoid unnecessary risk to individuals; • use of robotics or fabrication of special tools • use of temporary shielding • changing plant system lineups to reduce background exposure rates near operating equipment • use of short cut procedures, elimination of double checks and hold points, non-QA parts, tools, etc. • installation of jumpers and bypasses to achieve remote operation of equipment from lower dose areas **NOTE:** Some of the above options may involve intentionally violating Technical Specifications*, written procedures, or Quality Standards, but may be equally justifiable to the ED/SEC/SM as emergency exposure of personnel, depending on circumstances.	
1.2	Determine the optimum team composition in terms of skills and experience to ensure the highest degree of confidence in mission success in the least amount of time for exposure of personnel available.	_____
	NOTE: Emergency exposure is unwarranted in circumstances where alternative actions can achieve equal or better results.	
1.3	Review the Permit form prepared by the SRPC and concur with seeking emergency dose authorization.	_____

* NRC Notification required per EP G-3

EP RB-2 (UNITS 1 AND 2)
ATTACHMENT 9.4

TITLE: OSC Emergency Maintenance Coordinator OSC Director Checklist

	Actions	Initial
2.	SUBSEQUENT ACTIONS	
2.1	Ensure that the Team Leader is briefed on potential hazards that are expected and the limits of authority that he/she may exercise in making ad hoc decisions in the field.	_____
2.2	Ensure that a back-up team is chosen and prepared for immediate dispatch to rotate in, relieve, or rescue the primary response team, as needed.	_____
	NOTE: Back-up team shall be briefed, dressed out, pre-authorized, pre-staged in low dose area, standing by if needed for immediate action.	
2.3	Control any other concurrent activities that may hamper, impede, or otherwise increase the risk to the primary emergency response team.	_____
2.4	Ensure that the emergency operations coordinator is aware of the team location so that Operations activities from the Control Room do not change radiological conditions adversely without warning.	_____
2.5	Maintain an open communication line with the affected Unit Shift Foreman, as needed, to ensure that changes in plant status are immediately recognized and factored into ongoing risk assessment.	_____

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.5

1 AND 2

TITLE: EOF Radiological Manager Checklist

Actions	Initial

NOTE: All RCA Qualified personnel are automatically authorized to receive a dose up to, but not exceeding, the DCPP Administrative Limits for Calendar Year exposure (4.5 Rem TEDE) during an Alert or higher emergency classification event, EXCEPT as may be limited by lifetime and current year occupational dose already received or other restrictions such as a declared pregnancy.

1. INITIAL ACTIONS

When an analysis of radiological conditions, in accordance with EP EF-3, indicates that the planned or anticipated dose to any emergency response off-site field team member will exceed 10 CFR 20 annual limits, perform the following:

1.1 Review the dose evaluation with the Dose Assessment Coordinator and FMT Coordinator to determine if any alternative actions can achieve the desired results without requiring an emergency exposure such as rotation or replacement of team members, shorter sampling times, team movement tactics to avoid higher exposures, etc. _____

1.2 Obtain a working copy of form 69-10554, "Emergency Exposure Permit" (Attachment 9.7), and fill in the required information. _____

NOTE: Complete a new permit form for each off-site field team that is analyzed to require emergency exposure authorization, when needed.

1.3 Calculate and record the anticipated exposure to the most limiting team member and ensure that the authorized limit of 5 rem TEDE (total emergency exposure, not counting occupational dose prior to the emergency) will not be exceeded. _____

1.4 Provide the completed form 69-10554 to the ED for emergency exposure authorization. _____

NOTE: Voluntary consent is not necessary for emergency exposures authorized at less than 25 rem TEDE, but written authorization is required.

1.5 Obtain authorization from the ED for Thyroid Blocking Agent per EP RB-3, if necessary. _____

1.6 Notify the FMT Coordinator to communicate the authorizations to the Field Team Leaders affected when obtained from the ED. _____

NOTE: These authorizations are for PG&E personnel only. Separate authorizations for SLO County team members, if needed, must be obtained through the UDAC from the County Health Officer (CHO).

EP RB-2 (UNITS 1 AND 2)
ATTACHMENT 9.5

TITLE: EOF Radiological Manager Checklist

Actions	Initial

2. SUBSEQUENT ACTIONS

When the emergency exposure authorization is approved by the ED, then ensure that all conditions and limitations are understood by the field monitoring team prior to directing them to continue with their activities in the plume or plume affected areas.

With regard to the extraordinary circumstances of this activity ensure that the following additional actions are taken:

2.1 Ensure that each Team Member understands that whenever practical (without compromising the mission) ALARA principles should be used to minimize team exposure. _____

2.2 Ensure that Turn-back dose rates are re-analyzed for the present or projected characteristics of the plume and revised as needed. _____

****

CAUTION: IT IS FORBIDDEN TO ENTER ANY AREA WHERE THE DOSE RATES ARE UNKNOWN OR BEYOND THE RANGE OF INSTRUMENTATION AVAILABLE.

****

2.3 Ensure that the FMT Coordinator makes more frequent checks on accumulated dose (PED readings) and is controlling team deployment to minimize unnecessary exposures. _____

2.4 Begin the process of obtaining relief and replacements for the field monitoring team members, if necessary, to ensure continuous monitoring capability. _____

2.5 Consider deployment of additional teams in standby locations in case an active team can no longer function due to any of the following: _____

- gross contamination of vehicle, equipment, or personnel requires decontamination efforts.
- respirator use in field conditions creating additional heat stress and fatigue.
- higher than anticipated dose rates cause authorized exposure limits to be exceeded.
- vehicle breakdown or accident necessitates assistance to personnel stuck in plume pathway.

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.6 **1 AND 2**

TITLE: DCPP Emergency Exposure Guidelines

The following table contains guidelines for use in authorizing emergency exposures when lower doses are not practicable:

	RADIOLOGICAL ASSESSMENT SAMPLING (1)	PROPERTY SAVING (2)	DOSE SAVING TO POPULATION (3)*	LIFESAVING TO INDIVIDUAL (4)*
Emergency Actions----> Part of Body Irradiated	Sampling Under Emergency Conditions	Mitigating Damage to Valuable Property	Corrective Actions, stop/reduce a release	Lifesaving Actions, 1st Aid, Search and rescue
Whole Body	5 rem TEDE	10 rem TEDE	25 rem TEDE	25 rem TEDE
Skin & any Extremity	50 rem SDE	100 rem SDE	250 rem SDE	250 rem SDE
Lens of the Eye	15 rem LDE	30 rem LDE	75 rem LDE	75 rem LDE
Any Organ or Tissues	50 rem (CDE+DDE)	100 rem (CDE+DDE)	250 rem (CDE+DDE)	250 rem (CDE+DDE)

NOTES:

1. Radiological Assessment Sampling: Includes collection of atmospheric, liquid, and environmental radiological activity samples as well as chemistry samples involving high activity or high radiation. Emergency exposure limits may be authorized for selected individuals, for emergency assessment functions, in addition to annual occupational dose to date.
2. Property Saving, for example, might be dispatching the Fire Brigade to extinguish a fire in a Very High Radiation Area to protect plant equipment though no immediate threat exists to compromising Plant Safety.
3. Dose Saving to Population: Includes activities that justify a potential overexposure to a few workers in order to save even a small average dose in a large population. (May also include Traffic Control for Evacuees or other Security Plan Functions.)
4. Lifesaving to Individual: Includes the activity of search and rescue in very high dose rates or high airborne activity.

* Extreme situations may occur in which a dose in excess of 25 rem TEDE would be unavoidable for either Dose Saving to (Large) Population or Lifesaving to (An) Individual.

An authorization of emergency exposure with **NO LIMITS** may be made under those conditions, but only to volunteers who are fully aware of the risks involved, including the numerical levels of dose at which acute effects of radiation will be incurred and the numerical estimates of the risk of delayed effects.

NOTES: (continued)

5. If any of the above emergency exposure limits would prevent successful completion of the activity then the ED/SEC/SM should ensure that back-up teams are standing by to rotate in and relieve the primary responders.

6. Volunteers for any authorized exposures above 25 rem TEDE should be made aware that there is some risk of acute health effects involved, however remote.

   - The dose limit of 75 rem to the whole body previously recommended by the EPA for lifesaving action represents a very high level of risk of both acute and delayed effects.
   - A dose of 100 rem is expected to result in an approximately 15 percent risk of temporary incapacity from non lethal acute effects and an indeterminate, but less than 5 percent, chance of death within 60 days. This is in addition to a risk of about 1 in 30 of incurring fatal cancer.
   - Such high risk levels can only be accepted by a recipient who has been made aware of the risks involved.
   - (Reference, EPA Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, May 1992)

   NOTE: Although EPA-400 guidelines say that no limit is applicable under extreme situations it is also true that the ED/SEC/SM must make the authorization and may impose a more restrictive limit if so desired consistent with the availability of personnel resources, alternative actions and the desire to avoid acute health effects of the volunteers.

DIABLO CANYON POWER PLANT
EP RB-2
ATTACHMENT 9.7

1 AND 2

TITLE: Emergency Exposure Permit

Date: _____ Time: _____ Permit #: _____

Responder(s): _____ _____
(Print)
_____ _____

RP Support: _____ _____

Description of Activity: _____

_____

_____

_____

_____

Special Hazards: _____

_____

Special Instructions: _____

_____

_____

Anticipated TEDE Rate: _____ (rem/hr)

Anticipated Stay Time: _____ (hr)

Anticipated TEDE: _____ (rem)

AUTHORIZED LIMIT: (Check One)

[ ] 5 rem TEDE
[ ] 10 rem TEDE
[ ] 25 rem TEDE
[ ] **NO LIMIT**

*Voluntary Consent (For potential exposures of ≥ 25 rem TEDE): I hereby volunteer to perform the activity described above and I acknowledge having received a radiological briefing. I am fully aware of the health risks associated with the anticipated exposure. (Sign Below.)

_____ _____

_____ _____

_____ _____

Authorization of SM or SEC or Emergency Director: Time:

_____ _____

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-A9

Title: Review Emergency Notification for Steam Generator Tube Rupture

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform ____X____ Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References: EP G-3, Emergency Notification of Off-Site Agencies, Rev 61

Alternate Path: Yes _____ No ____X____

Time Critical: Yes _____ No ____X____

Time Allotment: 15 minutes

Critical Steps: Per Examinee Response - Key

Job Designation: SRO

Rev Comments: New

Gen KA # / Rating: G2.4.40 – Knowledge of SRO responsibilities in emergency plan implementation. 4.5

AUTHOR: **LISA TORIBIO** DATE: **11/20/19**

OPERATIONS REPRESENTATIVE: **CHRIS MEHIGAN** DATE: **12/04/19**

Directions: All actions taken by examinee should be clearly documented. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure (as applicable) and told the steps with which to begin.

Required Materials: EP G-3, Emergency Notification of Off-Site Agencies, Rev 61

Initial Conditions: GIVEN:

- At 1055, U1 initiated a manual SI due to SGTR
- RCS temperature is 514°F
- At 1100, the SM declared FA1.1
- The ENF program is not working
- The WCSFM has manually prepared the Emergency Notification Form for FA1.1

NOTE: for the purposes of this JPM, this is a **"Drill"**

Initiating Cue: You are directed to review the Emergency Notification Form for the SM and determine if it should be approved, explaining your rationale.

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

NOTE: Do NOT provide examinee with Task Standard

Task Standard:
(refer to completed ENF form)

- **Box 6 should be "1100" – based on time of declaration given in Initial Conditions**
- **Box 8 should be "Radiological Release in progress" – based on item 5, SGTR is a condition attributable to the emergency event**
- **Box 10 should be "No PAR" based on emergency classification being less than a General Emergency**

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

Follow up Question Documentation:

Question: _____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

_____

_____

Examinee Response - Key
See Marked up form – next page

Examinee Response - KEY

DCPP Form 69-20596 (11/14/17) **U1&2** EP G-3 Attachment 3
Page 1 of 1

DCPP Emergency Notification Form

This is the Diablo Canyon Power Plant making an Emergency Notification. Please prepare to receive the message.

1. This is a: ☒ Drill ☐ Emergency
2. This is Message Number: 1
3. I am notifying you of a: ☒ New Classification ☐ New PAR
4. ☒ Unit 1 ☐ Unit 2
5. The Emergency Classification Level is:
   ☐ UNUSUAL EVENT (UE) ☒ ALERT
   ☐ SITE AREA EMERGENCY (SAE) ☐ GENERAL EMERGENCY (GE)
6. This classification was made on: Date: Today at Time: ~~1055~~ 1100
7. The Emergency Action Level (EAL) number is: FA1.1
   Brief event description: Loss or Potential Loss of Either Fuel Clad or RCS
8. Radiological Conditions:
   ☒ ~~Radiological Releases remain within normal limits~~
   ☒ Radiological Release in progress
   ☐ Radiological Release occurred but is now terminated
9. Wind Conditions: Speed: 2.4 m/sec x 2.2 = 5.28 mph Direction from: 288 degrees
10. Protective Action Recommendations (PAR) due to the Event:
    ☒ No PAR
    ☒ ~~PAR to Shelter PAZs:~~ ☒ 1 ☒ 2
    ☐ PAR to Evacuate PAZs: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12
    ☐ PAR to Evacuate Ocean: ☐ 5 Nautical Miles at Sea ☐ 10 Nautical Miles at Sea
    ☐ PAR to Administer KI per the SLO County Plan
    ☐ PAR for all other PAZ(s) to Monitor and Prepare
    ☐ Other: _____
11. Form Approved by: ☒ Shift Manager ☐ Site Emergency Coordinator ☐ Emergency Director
    Name: S. Willson Date: _____ Time: _____

12. Notification Made Verbally To:	Date	Start Time	Person Contacted
County (SLO) Use Tie Line OR Call 1-805-781-4553			
State (CA) Use Tie Line OR Call 1-916-845-8911			
Record time SLO County and State Notification Completed: _____			
NRC (refer to NRC Form 361) 1-301-816-5100			
IF a GENERAL EMERGENCY has been declared AND the SLO County EOC is NOT activated, notify the USCG at 1-805-772-2167 (Morro Bay) OR 1-310-521-3815 (Long Beach Operations Center).			

Initial Conditions: GIVEN:

- At 1055, U1 initiated a manual SI due to SGTR
- RCS temperature is 514°F
- At 1100, the SM declared FA1.1
- The ENF program is not working
- The WCSFM has manually prepared the Emergency Notification Form for FA1.1

NOTE: for the purposes of this JPM, this is a **"Drill"**

Initiating Cue: You are directed to review the Emergency Notification Form for the SM and determine if it should be approved, explaining your rationale.

NOTE:

- You may use any source of information normally available (procedures, prints, etc.).
- Classroom instruction materials (Lesson Plans, System Training Manuals, PowerPoint presentations, classroom notes, etc.) are not permitted to be used.

If there is a question regarding reference material desired to be used, ask evaluator prior to seeking references.

DCPP Emergency Notification Form

This is the Diablo Canyon Power Plant making an Emergency Notification. Please prepare to receive the message.

1.	This is a: ☒ Drill ☐ Emergency
2.	This is Message Number: 1
3.	I am notifying you of a: ☒ New Classification ☐ New PAR
4.	☒ Unit 1 ☐ Unit 2
5.	The Emergency Classification Level is: ☐ UNUSUAL EVENT (UE) ☒ ALERT ☐ SITE AREA EMERGENCY (SAE) ☐ GENERAL EMERGENCY (GE)
6.	This classification was made on: Date: Today at Time: 1055
7.	The Emergency Action Level (EAL) number is: FA1.1 Brief event description: Loss or Potential Loss of Either Fuel Clad or RCS
8.	Radiological Conditions: ☒ Radiological Releases remain within normal limits ☐ Radiological Release in progress ☐ Radiological Release occurred but is now terminated
9.	Wind Conditions: Speed: 2.4 m/sec x 2.2 = 5.28 mph Direction from: 288 degrees
10.	Protective Action Recommendations (PAR) due to the Event: ☐ No PAR ☒ PAR to Shelter PAZs: ☒ 1 ☒ 2 ☐ PAR to Evacuate PAZs: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ PAR to Evacuate Ocean: ☐ 5 Nautical Miles at Sea ☐ 10 Nautical Miles at Sea ☐ PAR to Administer KI per the SLO County Plan ☐ PAR for all other PAZ(s) to Monitor and Prepare ☐ Other:
11.	Form Approved by: ☒ Shift Manager ☐ Site Emergency Coordinator ☐ Emergency Director Name: S. Willson Date: Time:

12. Notification Made Verbally To:	Date	Start Time	Person Contacted
County (SLO) Use Tie Line OR Call 1-805-781-4553			
State (CA) Use Tie Line OR Call 1-916-845-8911			
Record time SLO County and State Notification Completed:			
NRC (refer to NRC Form 361) 1-301-816-5100			
IF a GENERAL EMERGENCY has been declared AND the SLO County EOC is NOT activated, notify the USCG at 1-805-772-2167 (Morro Bay) OR 1-310-521-3815 (Long Beach Operations Center).			

Instructions for DCPP Emergency Notification Form U1&2 Attachment 1: Page 1 of 7

1. General Instructions
   a. Information on the DCPP Emergency Notification Form (ENF) is provided to SLO County and the State **within 15 minutes** for any new, or change in, emergency classification level or PARs.
   b. In the event that a General Emergency is declared and the SLO County EOC is not yet activated, the USCG will need to be notified by DCPP of the emergency classification level and any applicable PARs.
      1) USCG notification should be done after SLO County and State notifications are completed.
2. ENF Creation and Detailed Content Instructions[T30899]
   a. Generating the form using the ENF computer program should result in some of the blocks automatically populating.
      1) The computer program should also select plant-based PARs.
   b. The following table provides guidance on completing each block of the DCPP Emergency Notification Form (ENF).

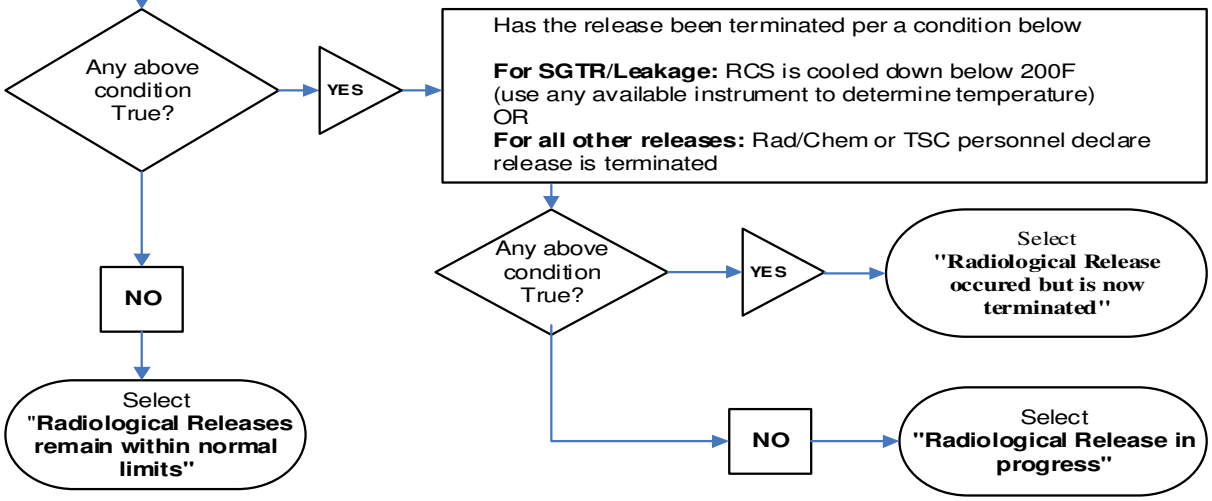
Block	Instructions
1 (PI)	**This is a: [ ] Drill [ ] Emergency** 1. If drill, select drill. 2. If real emergency, select emergency.
2	**This is Message Number: _____** 1. Throughout an event the message number should be entered sequentially regardless of the notification type, i.e., New Classification = 1, Follow-Up = 2, New Classification = 3, New PAR = 4, etc. 2. IF either unit OR both units is already in a declared emergency, THEN review all previously sent ENFs (initial and follow-up) to determine appropriate message number.
3	**I am notifying you of a: [ ] New Classification [ ] New PAR** 1. Select the reason for this notification. 2. Only one box should be checked. 3. IF a new classification includes a new PAR, THEN the "New Classification" box should be checked.
4	**[ ] Unit 1 [ ] Unit 2** 1. For unit specific events (EALs based on systems or events within a single unit's boundaries) **select the unit in the highest emergency classification level**. 2. Select both Unit 1 and Unit 2 for events affecting the entire station (e.g., earthquakes, security events, dry cask storage area, etc.)

Block	Instructions
5 (PI)	**The Emergency Classification Level is:** **[ ] UNUSUAL EVENT (UE)** **[ ] ALERT** **[ ] SITE AREA EMERGENCY (SAE)** **[ ] GENERAL EMERGENCY (GE)** 1. Ensure only one box is checked. 2. IF notification is being made for a **New Classification**, THEN select emergency classification level declared. 3. IF notification is being made for a **New PAR**, THEN ensure a General Emergency has been declared AND select General Emergency.
6 (PI Time Only)	**This classification was made on: Date: _____ at Time: _____** 1. IF notification is for a **New Classification**, THEN enter the date and time the emergency classification was declared. 2. IF notification is for a **New PAR**, THEN the date and time shall be the time the General Emergency was declared. 3. The preferred date format is "mm/dd/yyyy" (e.g., 03/31/2012); however, other formats are acceptable if they are accurate. 4. The preferred time format is military time (e.g., 1800); however, other formats are acceptable if they are accurate.
7	**The Emergency Action Level (EAL) Number is: _____** **Brief event description: _____** 1. IF notification is for a **New Classification**, THEN enter the EAL number for the new emergency classification level that is in effect. 2. IF notification is for a **New PAR**, THEN enter the EAL for the General Emergency that was declared. 3. DO NOT use jargon or acronyms when describing the event. 4. IF the description is automatically filled in by the computer, THEN it may be modified to more closely match the actual event.

Block	Instructions
8 (PI)	**Radiological Conditions:** **[ ] Radiological Releases remain within normal limits** **[ ] Radiological Release in progress** **[ ] Radiological Release occurred but is now terminated**

Any of the following conditions attributable to the emergency event:

1. A valid Alert Level Alarm on any Gaseous Effluent Radiation Monitor [NOT Plant Process Computer (PPC)].
   RM-14/14R RM-29
   RM-24/24R RM-28/28R
2. A valid High Level Alarm on RM-3, RM-18 or RM-23 liquid effluent radiation monitor.
3. An unmonitored release to the atmosphere
4. Elevated Radioactivity detected by survey or grab sampling in:
   - A site ventilation system
   - An outside area, either on or off site
5. Any Steam Generator Tube Rupture (SGTR)
6. A Steam Generator Tube Leak resulting in an Unusual Event classification



Block	Instructions
9	**Wind Conditions: Speed: ____ m/sec x 2.2 = ____ mph Direction From: ____ degrees** 1. Enter "Wind Speed" and "Direction" from available Meteorological Data. 2. IF time shown is outside the current quarter hour, THEN click on the update symbol above the "Met Data at {time}" 3. IF met data feed is not working, THEN obtain met tower data from the following sources in order of preference: • Primary Tower 10M Wind Direction and 10M Average Wind Speed • Primary Tower 76M Wind Direction and 76M Average Wind Speed • Backup Tower 10M Wind Direction and 10M Average Wind Speed • Backup Tower 60M Wind Direction and 60M Average Wind Speed • Tertiary Tower 10 meter (if deployed) wind direction and average wind speed 4. Met data may be available on: • http://pdnserver/ • PPC • eDNA on the PDN • The Met Computer in the TSC • The EARS application in the TSC and EOF 5. SLO County requires wind speed to be reported in miles per hour (mph ONLY). The conversion formula is meters/sec x 2.2 = mph.

Block	Instructions
10 (PI)	**Protective Action Recommendations (PAR) Due to the Event:** **[ ] No PAR** **[ ] PAR to Shelter PAZs [ ] 1 [ ] 2** **[ ] PAR to Evacuate PAZs [ ] 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ] 6 [ ] 7 [ ] 8 [ ] 9 [ ] 10 [ ] 11 [ ] 12** **[ ] PAR to Evacuate Ocean [ ] 5 Nautical Miles at Sea [ ] 10 Nautical Miles at Sea** **[ ] PAR to Administer KI per the SLO County Plan** **[ ] PAR for all other PAZ(s) to Monitor and Prepare** **[ ] Other**
	NOTE 1: Refer to EP RB-10, "Protective Action Recommendations" for detailed PAR instructions. NOTE 2: PARs remain in effect for the duration of the event, unless conditions change requiring a more restrictive PAR. PARs are NOT downgraded, when the conditions for initial entry into that PAR are no longer present. NOTE 3: Sheltering PARs are NOT made for the ocean.
	1. IF emergency classification level is a UE, ALERT, OR SAE, THEN recommend "No PAR".
	2. **GENERAL EMERGENCY Plant Based PARs** a. IF a RAPIDLY PROGRESSING SEVERE ACCIDENT is in progress, as indicated by the presence of ALL of the following: • A GENERAL EMERGENCY was declared **AND** • Initial PAR **AND** • Any containment loss EAL applicable **AND** • RM 30/31 > 5000 R/hr **OR** • EAL RG1.1 met for any Table R-1 GE value THEN recommend ALL of the following protective actions: • Evacuate PAZ 1 and 2. • Evacuate all applicable downwind PAZs (3-5) based on the wind direction table in Attachment 4 of EP RB-10. • Evacuate the ocean based on the wind direction table in Attachment 4 of EP RB-10. • Administer KI per the SLO County Plan. • All other PAZ(s) Monitor and Prepare.

Block	Instructions
10 (PI)	**GENERAL EMERGENCY Plant Based PARs (Continued)** b. IF a CONTROLLED RELEASE is in progress, AND ALL of the following conditions exist: • A GENERAL EMERGENCY was declared • Expected release duration LESS THAN 60 minutes THEN recommend ALL of the following protective actions: • Shelter PAZ 1 and 2. • Evacuate ocean to 5 NM. • Administer KI per the SLO County Plan. • All other PAZ(s) Monitor and Prepare. c. IF a GENERAL EMERGENCY has been declared, which is NOT either of the following: • RAPIDLY PROGRESSING SEVERE ACCIDENT OR • CONTROLLED RELEASE (expected release duration LESS THAN 60 minutes) THEN recommend ALL of the following protective actions: • Evacuate PAZ 1 and 2. • Evacuate ocean to 5 NM. • Administer KI per the SLO County Plan. • All other PAZ(s) Monitor and Prepare.
	3. **GENERAL EMERGENCY Expanded PARs** a. IF at any time, the projected offsite dose in ANY PAZ not currently recommended for evacuation exceeds either: • 1000 mrem TEDE OR • 5000 mrem Thyroid CDE THEN recommend ALL of the following protective actions: • Evacuate all affected PAZs. • Administer KI per the SLO County Plan. b. IF at any time, the projected offsite dose over the ocean beyond 5 miles exceeds either • 1000 mrem TEDE OR • 5000 mrem Thyroid CDE THEN recommend ALL of the following protective actions: • Evacuate the ocean to 10 NM. • Administer KI per the SLO County Plan.

Block	Instructions
10 (PI)	NOTE 1: Land areas beyond the Emergency Planning Zone (EPZ) are those land areas beyond PAZs 8, 9, 11 and 12. NOTE 2: Ocean areas beyond the Emergency Planning Zone (EPZ) are those ocean areas beyond 10 miles.
	4. **PARs for area beyond the Emergency Planning Zone** IF the SM/SEC/ED declares a PAR for an area beyond the EPZ boundary, THEN: a. Obtain the affected 22.5 degree wind rose sector(s) and adjacent sectors from the SM/SEC/ED. b. Obtain distance from SM/SEC/ED for which the PAR needs to be made. c. Select "Other" d. Recommend ALL of the following protective actions: • Write in the available text field something similar to: "Evacuate sectors [sectors obtained from SM/SEC/ED] out to [distance obtained from SM/SEC/ED] miles [nautical miles if area is over ocean]." • Administer KI per the SLO County Plan.
11	**Form Approved by: [ ] Shift Manager [ ] Site Emergency Coordinator [ ] Emergency Director** **Name: _____ Date: _____ Time: _____** 1. Check the appropriate box of the approver of the ENF. 2. Enter the approver name. 3. The "Date" and "Time" is when the Emergency Notification Form is approved by the SM, SEC, or ED.
12	Block 12 is completed by the Communicator in the CR/TSC/EOF to document when notification was made and to record the name of the person contacted. 1. Perform phone calls using Attachment 6.

Primary Meteorological (MET) Points

Point ID	Description	DateTime	Quality	Value	Units
MT1_1	10M Wind Direction	Today - Now	GOOD	288.42	degrees
MT1_2	10M Sigma Theta	Today - Now	GOOD	10.16	degree
MT1_3	10M Average Wind Speed	Today - Now	GOOD	2.4	m/sec
MT1_4	10M Temperature	Today - Now	GOOD	12.01	deg C
MT1_5	46M Temperature	Today - Now	GOOD	11.43	deg C
MT1_6	76M Wind Direction	Today - Now	GOOD	294.42	degree
MT1_7	76M Sigma Theta	Today - Now	GOOD	9.13	degree
MT1_8	76M Average Wind Speed	Today - Now	GOOD	2.31	m/sec
MT1_9	76M Temperature	Today - Now	GOOD	11.17	deg C
MT1_10	10M Peak Wnd Speed	Today - Now	GOOD	3.63	m/sec
MT1_11	Precipitation	Today - Now	GOOD	5.9	cm
MT1_12	76M Peak Wnd Speed	Today - Now	GOOD	3.44	m/sec
MT1_13	SB X/Q Dispersion	Today - Now	GOOD	4.5738 E-5	sec/m^3
MT1_14	SB Sigma Y	Today - Now	GOOD	106.01	meters
MT1_15	1.0Km X/Q	Today - Now	GOOD	3.4389 E-5	sec/m^3
MT1_16	1.0 Km Sigma Y	Today - Now	GOOD	119.56	meters
MT1_17	2.0 Km X/Q	Today - Now	GOOD	3.4389 E-5	sec/m^3
MT1_18	2.0 Km Sigma Y	Today - Now	GOOD	184.78	meters
MT1_19	4.0 Km X/Q	Today - Now	GOOD	5.5252 E-6	sec/m^3
MT1_20	4.0 Km Sigma Y	Today - Now	GOOD	305.29	meters
MT1_21	6.0 Km X/Q	Today - Now	GOOD	3.1343 E-6	sec/m^3
MT1_22	6.0 Km Sigma Y	Today - Now	GOOD	416.75	meters
MT1_23	8.0 Km X/Q	Today - Now	GOOD	2.0988 E-6	sec/m^3
MT1_24	8.0 Km Sigma Y	Today - Now	GOOD	522.97	meters
MT1_25	10.0 Km X/Q	Today - Now	GOOD	1.546 E-6	sec/m^3
MT1_26	10.0 Km Sigma Y	Today - Now	GOOD	625.85	meters
MT1_27	25.0 Km X/Q	Today - Now	GOOD	4.4833 E-7	sec/m^3
MT1_28	25.0 Km Sigma Y	Today - Now	GOOD	2240.86	meters
MT1_29	50.0 Km X/Q	Today - Now	GOOD	1.845 E-7	sec/m^3
MT1_30	50.0 Km Sigma Y	Today - Now	GOOD	2240.86	meters
MT1_31	Mixing Height	Today - Now	GOOD	600	meters
MT1_32	Horizontal Stability	Today - Now	GOOD	4	(1-7)
MT1_33	Vertical Stability	Today - Now	GOOD	4	(1-7)
MT1_34	Dewpoint	Today - Now	GOOD	11.16	deg C
MT1_35	Downwind sector	Today - Now	GOOD	ESE	sector
MT1_36	Rainfall (EARS)	Today - Now	GOOD	0	in/15min

Backup Meteorological (MET) Points

Point ID	Description	DateTime	Quality	Value	Units
MT2_1	10M Wind Direction	Today - Now	GOOD	284.58	degrees
MT2_2	10M Sigma Theta	Today - Now	GOOD	6.93	degree
MT2_3	10M Average Wind Speed	Today - Now	GOOD	3.24	m/sec
MT2_4	10M Temperature	Today - Now	GOOD	11.74	deg C
MT2_6	60M Wind Direction	Today - Now	GOOD	289.46	degree
MT2_7	60M Sigma Theta	Today - Now	GOOD	6.41	degree
MT2_8	60M Average Wind Speed	Today - Now	GOOD	3.03	m/sec
MT2_9	60M Temperature	Today - Now	GOOD	11.24	deg C
MT2_10	10M Peak Wind Speed	Today - Now	GOOD	4.37	m/sec
MT2_12	60M Peak Wnd Speed	Today - Now	GOOD	4.09	m/sec
MT2_13	SB X/Q Dispersion	Today - Now	GOOD	5.801 E-5	sec/m^3
MT2_14	SB Sigma Y	Today - Now	GOOD	61.98	meters
MT2_15	1.0 Km X/Q Dispersion	Today - Now	GOOD	4.2467 E-5	sec/m^3

MT2_16	1.0 Km Sigma Y		GOOD	71.8	meters
MT2_17	2.0 Km X/Q	Today - Now	GOOD	1.598 E-5	sec/m^3
MT2_18	2.0 Km Sigma Y	Today - Now	GOOD	119.71	meters
MT2_19	4.0 Km X/Q	Today - Now	GOOD	6.0253 E-6	sec/m^3
MT2_20	4.0 Km Sigma Y	Today - Now	GOOD	207.76	meters
MT2_21	6.0 Km X/Q	Today - Now	GOOD	3.376 E-6	sec/m^3
MT2_22	6.0 Km Sigma Y	Today - Now	GOOD	287.12	meters
MT2_23	8.0 Km X/Q	Today - Now	GOOD	2.2512 E-6	sec/m^3
MT2_24	8.0 Km Sigma Y	Today - Now	GOOD	361.82	meters
MT2_25	10.0 Km X/Q	Today - Now	GOOD	1.6555 E-6	sec/m^3
MT2_26	10.0 Km Sigma Y	Today - Now	GOOD	433.84	meters
MT2_27	25.0 Km X/Q	Today - Now	GOOD	4.8253 E-7	sec/m^3
MT2_28	25.0 Km Sigma Y		GOOD	905.81	meters
MT2_29	50.0 Km X/Q		GOOD	1.9471 E-7	sec/m^3
MT2_30	50.0 Km Sigma Y		GOOD	1575.54	meters
MT2_31	Mixing Height		GOOD	600	meters
MT2_32	Horizontal Stability		GOOD	5	(1-7)
MT2_33	Vertical Stability		GOOD	4	(1-7)
MT2_34	Dewpoint		GOOD	-1	deg C
MT2_35	Down wind sector		GOOD	ESE	sector

Point Buchon

Point ID	Description	DateTime	Quality	Value	Units
MT3_3	Time	Today - Now	GOOD	1130	hhmm
MT3_4	Wind speed	Today - Now	GOOD	2.63	m/sec
MT3_5	Wind direction	Today - Now	GOOD	248.4	degrees
MT3_8	Temperature		GOOD	12.11	deg C
MT3_10	Horizontal Stability		GOOD	1	(1-7)
MT3_11	Vertical Stability		GOOD	1	(1-7)

Los Osos Memorial Center

Point ID	Description	DateTime	Quality	Value	Units
MT4_3	Time	Today - Now	GOOD	1130	hhmm
MT4_4	Wind speed	Today - Now	GOOD	3.26	m/sec
MT4_5	Wind direction	Today - Now	GOOD	351.6	degrees
MT4_8	Temperature	Today - Now	GOOD	15.55	deg C
MT4_10	Horizontal Stability	Today - Now	GOOD	4	(1-7)
MT4_11	Vertical Stability	Today - Now	GOOD	4	(1-7)

Foothill

Point ID	Description	DateTime	Quality	Value	Units
MT5_3	Time	Today - Now	GOOD	1130	hhmm
MT5_4	Wind speed	Today - Now	GOOD	2.56	m/sec
MT5_5	Wind direction	Today - Now	GOOD	287.1	degrees
MT5_8	Temperature	Today - Now	GOOD	19.63	deg C
MT5_10	Horizontal Stability	Today - Now	GOOD	1	(1-7)
MT5_11	Vertical Stability	Today - Now	GOOD	1	(1-7)

Service Center

Point ID	Description	DateTime	Quality	Value	Units
MT6_3	Time	Today - Now	GOOD	1130	hhmm
MT6_4	Wind speed	Today - Now	GOOD	0.92	m/sec

MT6_5	Wind direction	Today - Now	GOOD	348.6	degrees
MT6_8	Temperature	Today - Now	GOOD	20.2	deg C
MT6_10	Horizontal Stability	Today - Now	GOOD	1	(1-7)
MT6_11	Vertical Stability	Today - Now	GOOD	1	(1-7)

Education Center

Point ID	Description	DateTime	Quality	Value	Units
MT7_3	Time	Today - Now	BAD	1045	hhmm
MT7_4	Wind speed	Today - Now	BAD	1.46	m/sec
MT7_5	Wind direction	Today - Now	BAD	244.6	degrees
MT7_8	Temperature	Today - Now	BAD	22.93	deg C
MT7_10	Horizontal Stability	Today - Now	BAD	1	(1-7)
MT7_11	Vertical Stability	Today - Now	BAD	1	(1-7)

Davis Peak

Point ID	Description	DateTime	Quality	Value	Units
MT8_3	Time	Today - Now	GOOD	1130	hhmm
MT8_4	Wind speed	Today - Now	GOOD	0.81	m/sec
MT8_5	Wind direction	Today - Now	GOOD	278.2	degrees
MT8_8	Temperature	Today - Now	GOOD	26.49	deg C
MT8_10	Horizontal Stability	Today - Now	GOOD	1	(1-7)
MT8_11	Vertical Stability	Today - Now	GOOD	1	(1-7)

Grover Beach

Point ID	Description	DateTime	Quality	Value	Units
MT9_3	Time	Today - Now	GOOD	1130	hhmm
MT9_4	Wind speed	Today - Now	GOOD	2.31	m/sec
MT9_5	Wind direction	Today - Now	GOOD	236.9	degrees
MT9_8	Temperature	Today - Now	GOOD	13.12	deg C
MT9_10	Horizontal Stability	Today - Now	GOOD	2	(1-7)
MT9_11	Vertical Stability	Today - Now	GOOD	2	(1-7)

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-LJCS1

Title: Verify Misaligned Rod Is Not Stuck

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform ____X____ Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References: OP AP-12B, Control Rod Misalignment, Rev. 19 (include Appendix B)
OP AP-12C, Dropped Control Rod, Rev. 17

Alternate Path: Yes ____X____ No _____

Time Critical: Yes _____ No ____X____

Time Allotment: 10 minutes

Critical Steps: 3.1, 5.1, 5.2, 7.1

Job Designation: RO/SRO

Rev Comments/LRN TIPS: Modified from DCPP Bank: LJC-066

DCPP Task # / Rating: 80200 4.0

Gen KA # / Rating: 001.A2.03 – Ability to (a) predict the impacts of the following malfunction or operations on the CRDS- and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: effect of stuck or misaligned rod. 3.5 / 4.2

AUTHOR: **LISA TORIBIO** DATE: **09/19/19**

OPERATIONS REPRESENTATIVE: **CHRISTOPHER MEHIGAN** DATE: **12/03/19**

REV. 0

Directions: All actions taken by examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the steps with which to begin.

Required Materials: OP AP-12B, Control Rod Misalignment (Including Appendix B)

OP AP-12C, Dropped Control Rod

Initial Conditions: Given:

- Unit 1 is at approximately 75% power and was in the process of being returned to 100% following curtailment for condenser cleaning.
- The power increase was stopped 5 minutes ago when control rod K2 was observed to be greater than 12 steps below the other Control Bank D rods based on DRPI.
- Procedure OP AP-12B, Control Rod Misalignment, has been implemented.

Initiating Cue: The Shift Foreman directs you to perform Step 14 of OP AP-12B.

NOTE: Do NOT provide examinee with Task Standard

Task Standard:

- **Determined control rod K2 is NOT stuck by performing the following actions:**
  - **Turned the ROD BANK/MODE SELECT switch to the CBD position**
  - **Inserted rods for Control Bank D until a DRPI change on rod K2 is observed**
- **Manually tripped reactor before Control Bank D is restored to original demand position recorded on step 2.1 of this JPM.**

** Denotes Critical Step and Sub-Steps

Start Time: _____

	Step		Expected Operator Actions
1.	AP-12B, Step 14.a - Check Grp 1 and grp 2 of each bank – at the same step on demand step counter.	1.1	Read CAUTIONS prior to Step 14.a. If asked about RIL, then state the "Another operator will monitor RIL"
		1.2	Checked both groups of bank D at the same step as the demand counter.
			Step was: Sat _____ Unsat _____

Comments:

			NOTE: All positions may be recorded, but are not required.
2.	AP-12B, Step 14.b - Record the bank demand positions.	2.1	Recorded Control Bank D demand position.
			Step was: Sat _____ Unsat _____

Comments:

**	3.	AP-12B, Step 14.c - Rotate the Rod Bank Selector Switch to the - AFFECTED BANK.	**	3.1 Turned the ROD BANK/MODE SELECT switch to the CBD position.
				Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
4.	AP-12B, Step 14.d - Record the plant process computer position for the affected bank.	4.1	Displayed the Control Bank D position from the plant computer and records the value.
			NOTE: ***Operator may call up the CBD address listed in App. B of AP-12B (U0052), or record the value from an existing group display.***
			Step was: Sat _____ Unsat _____

Comments:

**	5.	AP-12B, Step 14.e,f - Drive the affected bank in several steps (enough to see a DRPI change).	**	5.1 Inserted rods for Control Bank D until a DRPI change is observed.
			**	5.2 Identified that rod K2 moves and diagnoses that rod K2 is not stuck.
				5.3 Reported status to Shift Foreman.
				NOTE: Status of control rod may be reported after rod restored to its recorded position.
				Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
6.	AP-12B, Step 14.g - Return the rods in the affected bank to the position recorded in Step 14.a.	6.1	Attempted to move rods back out to original position.
	<< Alternate Path – Start Point >>		
		6.2	Identified multiple dropped rods during restoration of Control Bank D.

Step was: Sat _____ Unsat _____

Comments:

** 7.	Enters OP AP-12C, Dropped Control Rod and performs step 1.	** 7.1	Tripped the Reactor.
	<< Alternate Path – End Point >>		

Step was: Sat _____ Unsat _____

Comments:

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

_____

_____

** Denotes Critical Step and Sub-Steps

- ❑ Restore the simulator to IC-11 (75%, MOL).
- ❑ Set PPC screen at SRO desk to RBU display (rodconfig).
- ❑ Verify step counters matched (group 1 and 2) and RBU are updated to current CBD rod position.
- ❑ Enter Lesson file L181-LJCS1

Description	L3 Commands
Sets rod k2 15 steps below Bank D	insert MAL_ROD3_K02 MOVEABLE delay=0 ramp=0 label ROBERPPCDGRP2NDRF 12 label ROBERPPCDGRP2DRFT(4) 1 label ROBERPPCDGRP2RSPD 1 insert C1_085S_5 1 delay=0 ramp=0 insert C1_086S_1 1 delay=0 ramp=0 delIA MAL_ROD3_K02 2 delay=1 cd='c1_086s_1' delIA C1_086S_1 2 delay=1 cd='' delIA C1_085S_5 2 delay=2 cd=''
Freeze Sim after 60 seconds to allow for temperature transient	unfreeze freeze delay=60
Drop two rods on Rod Cntl Out	insert MAL_ROD3_K02 STATIONARY delay=2 cd='c1_086s_3' insert MAL_ROD3_P10 STATIONARY delay=2 cd='c1_086s_3'

- ❑ Verify Sim has run long enough for Tave to settle.
- ❑ Place Rod Control Switch to Manual after simulator goes to freeze.
- ❑ Place pink tag for RODS IN MANUAL on CC1.
- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet.

Initial Conditions: Given:

- Unit 1 is at approximately 75% power and was in the process of being returned to 100% following curtailment for condenser cleaning.
- The power increase was stopped 5 minutes ago when control rod K2 was observed to be greater than 12 steps below the other Control Bank D rods based on DRPI.
- Procedure OP AP-12B, Control Rod Misalignment, has been implemented.

Initiating Cue: The Shift Foreman directs you to perform Step 14 of OP AP-12B.

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-LJCS2

Title: Respond to Changing Plant Parameters During Reactor Trip Response

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform ____X____ Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References: EOP E-0.1, Reactor Trip Response, Rev 43

Alternate Path: Yes ____X____ No _____

Time Critical: Yes _____ No ____X____

Time Allotment: 5 minutes

Critical Steps: 2.4, 6.2

Job Designation: RO/SRO

Rev Comments/LRN TIPS: New

DCPP Task # / Rating: 47080

Gen KA # / Rating: 013.A2.01 – Ability to (a) predict the impacts of the following malfunction or operations on the ESFAS system and (b) based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations: LOCA. 4.6 / 4.8

Directions: All actions taken by examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After

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AUTHOR: **LISA TORIBIO** DATE: **10/11/19**

OPERATIONS REPRESENTATIVE: **CHRISTOPHER MEHIGAN** DATE: **12/03/19**

REV. 0

identifying the appropriate procedure for the task, the examinee may be given the procedure and told the steps with which to begin.

Required Materials: EOP E-0.1, Reactor Trip Response, Rev 43 (with Fold Out Pages)

Initial Conditions: Given:

- Unit 1 experienced an inadvertent Reactor Trip. The cause is presently unknown.
- The Crew has completed EOP E-0 and has now transitioned to EOP E-0.1, Reactor Trip Response..

Initiating Cue: The Shift Foreman directs you to begin implementation of EOP E-0.1, beginning with Step 1.

NOTE: Do NOT provide examinee with Task Standard

Task Standard:

- **Provided greater than 435 gpm Aux Feedwater Flow by starting any of the following:**
  MDAFW Pump 1-2
  and/or
  MDAFW Pump 1-3
  and/or
  TDAFW Pump 1-1
  before S/G level drops below 15% NR in all four Steam Generators

- **Manually actuated Safety Injection before subcooling falls below 0°F**

** Denotes Critical Step and Sub-Steps

Start Time: _____

	Step		Expected Operator Actions
1.	E-0.1, Step 1 - Check RCS Temperature Response – Stable or trending to 547 °F.	1.1	Checked RCPs running.
		1.2	Determined RCS temperature was NORMAL.
			Step was: Sat _____ Unsat _____

Comments:

** 2.	E-0.1, Step 2 - Check Fdwtr Status.	2.1	Checked RCS temperature less than 554°F.
		2.2	Checked Feedwater Isolation complete: • Red Activated Light – ON • White Status Light - OFF
			NOTE: AFW pump autostarts have been disabled.
		2.3	Determined total AFW flow was NOT greater than 435 gpm.
		** 2.4	Started one or more AFW pumps: • MDAFW Pump 1-2 and/or • MDAFW Pump 1-3 and/or • TDAFW Pump 1-1
			Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

Step		Expected Operator Actions
		NOTE: Candidate may respond to indications of a LOCA based on Fold Out Page and not complete checks for Control Rod Insertion and Pressurizer Level Control
3.	E-0.1, Step 3 – Check all Control Rods fully inserted.	3.1 Determined all control rods fully inserted.
		Step was: Sat _____ Unsat _____

Comments:

4.	E-0.1, Step 4 – Check PZR Level Controls	4.1 Determined pressurizer level NOT greater than 17%.
		4.2 Determined auto isolation of letdown had already occurred.
		4.3 Determined pressurizer heaters already off due to low pressurizer level.
		4.4 Increased charging flow to maximum by throttling FCV-128 full open.
		Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

Step		Expected Operator Actions	
<< Alternate Path – Start Point >>			
			NOTE: Any of the following may be used to identify SBLOCA.
5.	Identifies multiple indications of a small break LOCA.	5.1	Identified indications of Small Break LOCA: • RCS Pressure lowering • Pressurizer level lowering • Subcooling lowering • Containment sump levels rising
			Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
**	6. Implements Fold Out Page Item #2		**NOTE: Auto Safety Injection signal for low RCS pressure (1850 psig) has been disabled**
		6.1	Determined either Safety Injection Criteria for Fold Out Page Item #2 met: • RCS Subcooling based on Core Exit Thermocouples – Less than 20°F • PZR Level – Cannot be maintained greater than 6% OR • RCS Pressure below auto SI setpoint of 1850 psig.
		** 6.2	Manually actuated Safety Injection
		6.3	Informed Shift Foreman transition to EOP E-0, Reactor Trip or Safety Injection is required.

<< Alternate Path – End Point >>

Step was: Sat _____ Unsat _____

Comments:

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

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Response: _____

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** Denotes Critical Step and Sub-Steps

- ❑ Restore the simulator to IC-12 (50%, MOL).
- ❑ Enter Lesson file L181-LJCS2

Description	**L3 Commands**
Fails Auto SI	insert MAL_PPL3A AUTO insert MAL_PPL3B AUTO
Trip Rx and reset rods	insert C1_072S_3 1 delIA C1_072S_3 2 delay=2 cd='' insert C1_064S_1 1 delIA C1_064S_1 2 delay=2 cd=''
Freeze Sim after 60 seconds to allow for temperature transient	unfreeze freeze delay=60
RCS leak (triggered on AFW pump start)	insert MAL_RCS3B 2.5 cd='h_v3_221r_1 or h_v3_222r_1' delay=0 ramp=30

- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet.

Initial Conditions: Given:

- Unit 1 experienced an inadvertent Reactor Trip. The cause is presently unknown.
- The Crew has completed EOP E-0 and has now transitioned to EOP E-0.1, Reactor Trip Response..

Initiating Cue: The Shift Foreman directs you to begin implementation of EOP E-0.1, beginning with Step 1.

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-S3

Title: Isolate a LOCA Outside Containment

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform X Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References:	EOP ECA-1.2, LOCA Outside Containment, Rev. 6C	
Alternate Path:	Yes _____ No X	
Time Critical:	Yes _____ No X	
Time Allotment:	10 minutes	
Critical Steps:	3.1, 3.2, 3.4	
Job Designation:	RO/SRO	
Rev Comments/LRN TIPS:	Bank: LJC-118	
DCPP Task # / Rating:	111200, 886600	3.8 / 3.5
Gen KA # / Rating:	E04.EA1.1 – Ability to operate and/or monitor components and functions of control and safety systems including instrumentation, signals, interlocks, failure modes, and automatic and manual features as they apply to a LOCA Outside Containment.	4.0 / 4.0

AUTHOR: **LISA TORIBIO** DATE: **09/19/19**

OPERATIONS REPRESENTATIVE: **CHRISTOPHER MEHIGAN** DATE: **12/03/19**

REV. 0

Directions: All actions taken by examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the steps with which to begin.

Required Materials: EOP ECA-1.2, LOCA Outside Containment

Initial Conditions: Given:

- Unit 1 has experienced a Safety Injection
- Automatic actuation of safeguards equipment was verified
- It was determined that SI cannot be terminated and abnormal radiation has been observed in the Auxiliary Building

Initiating Cue: The Shift Foreman directs you to perform the actions for a LOCA outside containment, in accordance with ECA-1.2, starting on step 1.

DO NOT READ TASK STANDARD TO EXAMINEE

Task Standard: Completed actions to isolate LOCA outside containment and identify the correct procedure for recovery as follows:

- **Cut in series contactor toggle switch for 8809B**
- **Closed 8809B, RHR to cold legs 3 and 4**
- **Identified EOP E-1 as correct procedure for recovery**

** Denotes Critical Step and Sub-Steps

Start Time: _____

Step	Expected Operator Actions
1. EOP ECA-1.2, Step 1 – Verify Proper Valve Alignment.	1.1 Determined following valves are in the correct position: • 8702, RCS RHR Suct LP4 HL – CLOSED • 8701, RCS RHR Suct LP4 HL – CLOSED • 8703, RHR to hot legs 1 and 2 – CLOSED • 8802A, SI to hot legs 1 and 2 – CLOSED • 8802B, SI to hot legs 3 and 4 – CLOSED **Step was: Sat _____ Unsat _____**
Comments:	
2. EOP ECA-1.2, Step 2.a.1 – Try To Identify And Isolate Break (RHR cold legs 1 and 2)	2.1 Cut in series contactor toggle switch for 8809A. 2.2 Closed 8809A, RHR to cold legs 1 and 2. 2.3 Diagnosed RCS pressure still lowering. 2.4 Re-opened 8809A. **Step was: Sat _____ Unsat _____**
Comments:	

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
** 3.	EOP ECA-1.2, Step 2.a.2 – Try To Identify And Isolate Break (RHR cold legs 3 and 4)	** 3.1	Cut in series contactor toggle switch for 8809B.
		** 3.2	Closed 8809B, RHR to cold legs 3 and 4.
		3.3	Determined RCS pressure stable or rising.
		** 3.4	Identified EOP E-1 as correct procedure for recovery.
			Step was: Sat _____ Unsat _____

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

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Response: _____

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** Denotes Critical Step and Sub-Steps

- ❑ Restore the simulator to IC-10.
- ❑ Run Lesson file drl_1118 or manually enter the following:

Command	Description
Insert v2_225r_1 0, insert v2_225g_1 1	8701 Green ON, Red OFF
Insert v2_226r_1 0, insert v2_226g_1 1	8702 Green ON, Red OFF
Insert vlv_rhr1_2 1, label rrhh8701 0.5 Insert vlv_rhr1_2 0 cd='rrhh8809_2 lt 0.1' ramp=1	8702 OPEN, 8701 to 50% (closes when 8809B is CLOSED)
Insert mal_rhr1 400 ramp=5 delIA mal_rhr1 2 delay=100	RHR system leak
Insert c2_030s_2 1, delIA c2_032s_2 2 delay=5	Actuates SI
Insert v2_266s_1 1 delay=15 Insert v2_266s_1 2 delay=20	Stops CCP 1-3
Insert v4_388s_3 1 delay=15 Insert v4_388s_1 0	ABV Char Htr ON
Insert v3_179s_2 0 Insert v3_224s_1 1, Insert v3_225s_1 1 delIA v3_224s_1 2 delay=60 delIA v3_225s_1 2 delay=60	Stops all but one CB PP set
Insert v3_257s_1 1 delay=150, delIA v3_257s_1 2 delay=180 Insert v3_258s_1 1 delay=150, delIA v3_258s_1 2 delay=180 Insert v3_259s_1 1 delay=150, delIA v3_259s_1 2 delay=180 Insert v3_260s_1 1 delay=150, delIA v3_260s_1 2 delay=180	Closes ALL TDAFP LCVs
(only if lesson file NOT RUN) throttle AFW to 150 gpm/SG	Throttle AFW (manually)
RUN, then FRZ after 4 minutes	RUN for 4 minutes

- ❑ Reset SI, Reset Phase A Isolation, Open FCV-584 during 4 minute run.
- ❑ Scroll chart PR-403 forward so operator has a reference point for RCS pressure trends.
- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet.

Initial Conditions: Given:

- Unit 1 has experienced a Safety Injection
- Automatic actuation of safeguards equipment was verified
- It was determined that SI cannot be terminated and abnormal radiation has been observed in the Auxiliary Building

Initiating Cue: The Shift Foreman directs you to perform the actions for a LOCA outside containment, in accordance with ECA-1.2, starting on step 1.

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number:	NRCL181-LJCS4P
Title:	TRANSFER TO COLD LEG RECIRCULATION
Examinee:	_____
Evaluator:	_____ _____ _____ Print Signature Date
Testing Method:	Perform _____X_____ Simulate _____
Results:	Sat _____ Unsat _____ Total Time: _____ TCOA Time: _____
Comments:	(Note: Any Unsat step requires a numbered comment; use back as needed.)

References:	EOP E-1.3, Transfer to Cold Leg Recirculation, Rev. 34 OP1.ID2, Time Critical/Sensitive Operator Actions, Rev. 12	
Alternate Path:	Yes _____X_____ No _____	
Time Critical:	Yes _____X_____ No _____	
Time Allotment:	10 minutes	
Critical Steps:	2.4, 3.2, 4.1, 5.1, 5.3, 6.2, 6.4, 7.2, 7.4, 10.1, 10.3, 11.3, 11.6, 11.7	
Job Designation:	RO/SRO	
Rev Comments/LRN TIPS:	Bank LJC-027A	
DCPP Task # / Rating:	331200, 43200, 324800, 323600, 324600	3.5 / 4.5 / 4.0 / 4.0 / 4.0 (all RO)
Gen KA # / Rating:	011.EA1.1 – Ability to operate and/or monitor components and functions of the control and safety systems including instrumentation, signals, interlocks, failure modes, and automatic and manual features.	4.2 / 4.2

AUTHOR: **LISA TORIBIO** DATE: **12/04/19**

OPERATIONS REPRESENTATIVE: **CHRISTOPHER MEHIGAN** DATE: **12/04/19**

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure**. All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. If the task is being done in the plant or lab, and after identifying the appropriate procedure for the task, the examinee may be given the procedure and told what step to begin the task at.

Required Materials: Provide a copy of the reference procedure (partial procedure allowed), if the task is being done in the plant or lab.

Initial Conditions: Unit 1 experienced a LBLOCA and RWST level has decreased to 33%.

Initiating Cue: Given:

- The Shift Foreman directs you to perform EOP E-1.3 to align RHR for cold leg recirculation starting at step 1.
- App EE of EOP E-1.3 will be completed by another operator at your direction (using time compression).
- This is a time critical JPM.
- You may take a couple of minutes to preview the procedure before the task begins.

NOTE: Do NOT provide examinee with Task Standard

Task Standard: RHR has been aligned to the suction of the SI pumps and CCPs for cold leg recirculation by performing the following:

- Stopped RHR Pump 1-1
- Closed 8700A
- Closed 8716A and B
- Closed 8974A and B
- Closed 8105 and 8106 (only 1 of 2 required; series valves)
- Opened 8807A and B (only 1 of 2 required; parallel valves)
- Opened 8982A
- Re-started RHR Pump 1-1
- Opened 8804A

Within the 10 minutes of JPM start time.

Time Critical Operator Action (TCOA): This JPM was evaluated against TCOA #8 – Operator must transfer to cold leg recirculation within 10 minutes of the RWST reaching the low level setpoint which corresponds to the start time of this JPM. Case 2 – one RHR pump (1-2) does not trip and cannot be stopped from the control room for up to 5 minutes after the RWST reaches 33%.

This TCOA is applicable to this JPM; the appropriate steps will be designated as critical and the TCOA will be designated time critical.

Start Time: _____

	Step		Expected Operator Actions
1.	E-1.3, Step 1 - Implement Appendix EE.	1.1	Read note regarding FR procedures.
		1.2	Assigned operator to complete Appendix EE.
			***Note:* Actions for Appendix EE have already been completed in the setup for this JPM.**
			********** **Cue: "Appendix EE has is complete".** **********
			Step was: Sat _____ Unsat _____

Comments:

**	2.	E-1.3, Step 2 - Ensure RHR PP 1-2 stopped.	2.1	Observed that RHR PP 1-2 was running (red light ON and/or amps indicated).
			2.2	Attempted to secure RHR PP 1-2.
		<< Alternate Path – Start Point >>		
			2.3	Dispatched a Nuclear Operator to locally open the breaker for RHR PP 1-2.
			** 2.4	Skipped to E-1.3, step 4 (Did NOT close 8700B).
				Step was: Sat _____ Unsat _____

Comments:

**	3.	E-1.3, step 4 – Ensure RHR PP 1-1 stopped.	3.1	Observed that RHR PP 1-1 was running (red light ON and/or amps indicated).
			** 3.2	Secured RHR PP 1-1 with control switch (green light ON, and/or no amps indicated).
		<< Alternate Path – End Point >>		
				Step was: Sat _____ Unsat _____

Comments:

		Step			Expected Operator Actions
**	4.	E-1.3, step 5 - Close 8700A, RHR pump 1 normal suction valve.	**	4.1	Closed 8700A.
				4.2	Observed green light (only) ON for 8700A.
					Step was: Sat _____ Unsat _____

Comments:

**	5.	E-1.3, step 6 - Close 8716A and B, RHR pump discharge crosstie valves.	**	5.1	Closed 8716A.
				5.2	Observed green light (only) ON for 8716A.
			**	5.3	Closed 8716B.
				5.4	Observed green light (only) ON for 8716B.
					Step was: Sat _____ Unsat _____

Comments:

**	6.	E-1.3, step 7 - Isolate ECCS PPs Recirc Paths.		6.1	Observed RCS Pressure is < 1500 psig (VB-2, any PPC).
			**	6.2	Closed 8974A.
				6.3	Observed green light (only) ON for 8974A.
			**	6.4	Closed 8974B.
				6.5	Observed green light (only) ON for 8974B.
					Step was: Sat _____ Unsat _____

Comments:

		Step		Expected Operator Actions
**	7.	E-1.3, step 7 - Isolate ECCS PPs Recirc Paths (cont)	7.1	***Note:* Valves are in series. Only one is required closed to meet the critical step criteria.***
			** 7.2	Closed 8105.
			7.3	Observed green light (only) ON for 8105.
			** 7.4	Closed 8106.
			7.5	Observed green light (only) ON for 8106.
				Step was: Sat _____ Unsat _____

Comments:

	8.	E-1.3, step 8 - Check Containment Recirc Sump Level.	8.1 Observed Containment Recirc Sump Level > 92' on LI-940 & 941.
			Step was: Sat _____ Unsat _____

Comments:

	9.	E-1.3, step 9 – Verify RHR PP 1-2 Alignment.	9.1 Observed that RHR PP 1-2 was running (red light ON and/or amps indicated).
		<< ALTERNATE PATH START POINT >>	
			9.2 Skipped to E-1.3, step 10.
			Step was: Sat _____ Unsat _____

Comments:

	Step		Expected Operator Actions
**	10. E-1.3, step 10 - Crosstie SI PP suction to CCPs.	10.1	***Note:* Valves are in parallel. Only one is required open to meet the critical step criteria.**
		** 10.2	Opened 8807A.
		10.3	Observed red light (only) ON for 8807A.
		** 10.4	Opened 8807B.
		10.5	Observed red lights (only) ON for 8807B.
		10.6	Observed both ECCS CCPs are running (red lights ON).

<< ALTERNATE PATH END POINT >>

Step was: Sat _____ Unsat _____

Comments:

**	11. E-1.3, step 11 - Verify RHR PP 1-1 Alignment.	11.1	Observed that RHR PP 1-1 is not running (green light ON and/or no amps).
		11.2	Observed green light (only) ON for 8700A.
		** 11.3	Opened 8982A.
		11.4	Observed red light (only) ON for 8982A.
		11.5	Verified RHR HX 1-1 in service per App EE.
			**********
			Cue: App EE has been completed. Both RHR HXs are in service per the appendix.
			**********

Continued on next page

		Step			Expected Operator Actions
**	11	E-1.3, step 11 - Verify RHR PP 1-1 Alignment (continued)	**	11.6	Started RHR pump 1-1.
			**	11.7	Opened 8804A. **Note the time 8804A indicated full OPEN (TCOA stop time):** _____ **Step was: Sat _____ Unsat _____**

Comments: See page 1 for start_____ finish____ description

12. E-1.3, step 13 - Check at least one RHR PP running in Cold Leg Recirc Lineup.

****

Cue: The SFM has assigned other operators to complete this procedure.

****

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

TCOA Start Time: _____

TCOA Stop Time: _____

TCOA Total Time: _____ (Enter TCOA time on the cover page)

TCOA: **SAT** _____ **UNSAT** _____ (TCOA time must be < 10 minutes)

Follow up Question Documentation:

Question: _____

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Response: _____

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- Initialize to JPM IC 203.
- Execute lesson LJC-027A.lsn.

- This SNAP allows entry into EOP E-1.3 at Step 1. RWST level is 33%.
  Both RHR pumps are running.
  Step 1 (App EE has been completed by other operators, using time compression).
- Inform the examiner that the simulator setup is complete.

  NOTE: This JPM is time critical. Do NOT go to run until the examiner or examinee indicates that they are ready to begin. RWST low level will occur shortly after going to RUN.

❑ Go to RUN when the examinee states they are ready to perform the task.

Initial Conditions: Unit 1 experienced a LBLOCA and RWST level has decreased to 33%.

Initiating Cue: Given:

- The Shift Foreman directs you to perform EOP E-1.3 to align RHR for cold leg recirculation starting at step 1.
- App EE of EOP E-1.3 will be completed by another operator at your direction (using time compression).
- This is a time critical JPM.
- You may take a couple of minutes to preview the procedure before the task begins.

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-LJCS4S

Title: PERFORM OP AP-15 IMMEDIATE ACTIONS FOR MAIN FEED PUMP TRIP

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform X Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References:	OP AP-15, Loss of Feedwater Flow, Rev 26.	
Alternate Path:	Yes X No _____	
Time Critical:	Yes _____ No X	
Time Allotment:	5 minutes	
Critical Steps:	2.3, 5.3, 5.4	
Job Designation:	RO/SRO	
Rev Comments/LRN TIPS:	Bank LJC-247	
DCPP Task # / Rating:	47220	4.0
Gen KA # / Rating:	059.A2.07 – Ability to predict the impact of tripping of the MFW pump turbine on MFW and based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations.	3.0 / 3.3

AUTHOR: **LISA TORIBIO** DATE: **11/01/19**

OPERATIONS REPRESENTATIVE: **CHRISTOPHER MEHIGAN** DATE: **12/04/19**

REV. 0

Directions: All actions taken by examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the steps with which to begin.

Required Materials: Hard Card for Unit 1 OP AP-15, Loss of Feedwater Flow

Initial Conditions: Given:

- Unit 1 is at 100% power
- PK09-12, Main Feedwater Pump Trip, and PK09-13, Main Feedwater Pump No. 11, have just alarmed
- The Shift Foreman has announced he is entering OP AP-15, Loss of Feedwater Flow

Initiating Cue: The SFM directs you to perform immediate actions in response to plant conditions. OP AP-15 Immediate Action Hard Card may be used.

NOTE: Do NOT provide examinee with Task Standard

Task Standard:

- AFW Pumps 1-2 and 1-3 are running
- Rod Control is in MANUAL
- Rods inserted at maximum available rate (48 steps/min)

** Denotes Critical Step and Sub-Steps

Start Time: _____

	Step		Expected Operator Actions
1.	Obtain the correct Hard Card.	1.1	Hard Card for OP AP-15 Immediate Actions.

Step was: Sat _____ Unsat _____

Comments:

**	2.	Step 1 – CHECK Reactor Power Less Than 80%.	2.1	Read **CAUTION** regarding attempts to stabilize plant online.
			2.2	Determined power was greater than 80%.
			** 2.3	Performed Step 1 RNO • Started AFW Pp 1-2 • Started AFW Pp 1-3

Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
3.	Step 2 - REDUCE Turbine Load.	3.1	Determined turbine load was greater than 650 MW.
		3.2	Determined programmed ramp executing appropriately: • DEH MW feedback in service • TARGET set for 550 MW • RAMP RATE at 225 MW/min
			Step was: Sat _____ Unsat _____

Comments:

4.	Step 3 – CHECK MFW Pp Suction Pressure GREATER THAN 260 PSIG	4.1	Determined MFW Pp Suction Pressure was greater than 260 PSIG.
			Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

	Step	Expected Operator Actions
** 5.	Step 4 – ENSURE Rods Controlling Properly in AUTO.	5.1 Checked Tave/Tref mismatch greater than 1.5 ^{o}F.
		5.2 Determined rods were NOT controlling properly in Auto.
	<<Alternate Path – Start Point>>	
		** 5.3 Placed Rod Control in MANUAL,
		** 5.4 Inserted rods at maximum available rate of 48 steps/min.
	<<Alternate Path – End Point>>	
		**********
		Cue: "Another Operator will continue with the performance of OP AP-15".
		**********
		Step was: Sat _____ Unsat _____

Comments:

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

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Response: _____

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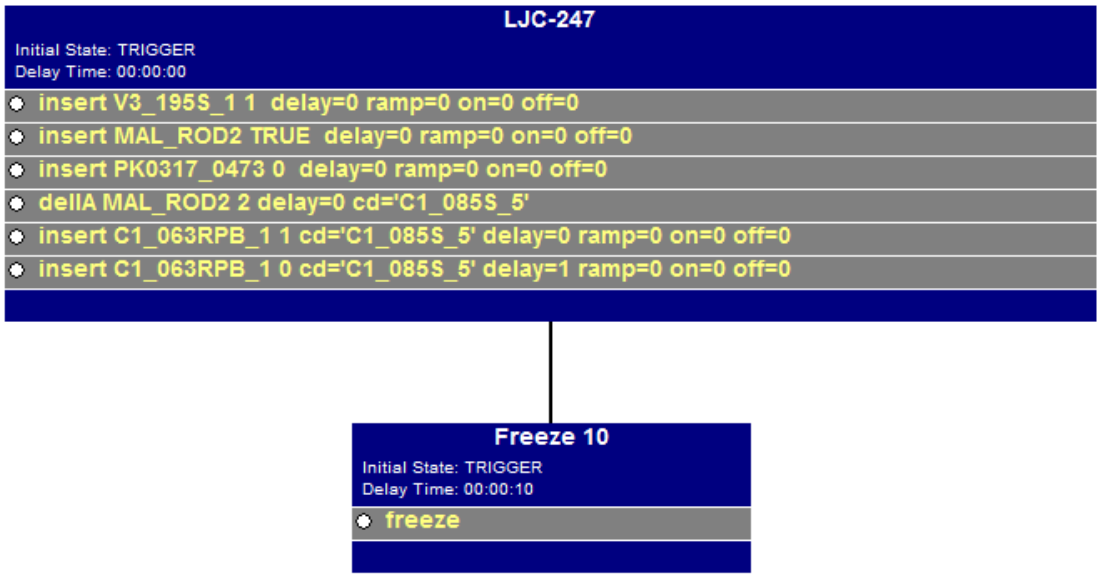
** Denotes Critical Step and Sub-Steps

- ❑ Restore the simulator to IC-10. .
- ❑ Run Lesson drl_1247.lsn or manually insert the following:



- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when instructed by examiner.

Initial Conditions: Given:

- Unit 1 is at 100% power
- PK09-12, Main Feedwater Pump Trip, and PK09-13, Main Feedwater Pump No. 11, have just alarmed
- The Shift Foreman has announced he is entering OP AP-15, Loss of Feedwater Flow

Initiating Cue: The SFM directs you to perform immediate actions in response to plant conditions. OP AP-15 Immediate Action Hard Card may be used.

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-LJCS5

Title: Initiate Containment Spray Manually

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform ____X____ Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References:	EOP FR-Z.1, Response to High Containment Pressure, Rev. 12	
Alternate Path:	Yes _____ No ____X____	
Time Critical:	Yes _____ No ____X____	
Time Allotment:	10 minutes	
Critical Steps:	3.1, 4.2	
Job Designation:	RO/SRO	
Rev Comments/LRN TIPS:	Bank LJC-010	
DCPP Task # / Rating:	849200, 835600	3.7 / 3.6
Gen KA # / Rating:	E14.EA1.1 – Ability to operate and/or monitor components and the functions of control and safety systems, including instrumentation, signals, interlocks, failure modes and automatic and manual features as they apply to high containment pressure.	3.7 / 3.7

AUTHOR: **LISA TORIBIO** DATE: **10/16/19**

OPERATIONS REPRESENTATIVE: **CHRISTOPHER MEHIGAN** DATE: **12/04/19**

REV. 0

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by the examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. If the task is being done in the plant or lab, and after identifying the appropriate procedure for the task, the examinee may be given the procedure and told what step to begin the task at.

Required Materials: Provide a copy of the reference procedure (partial procedure allowed), if the task is being done in the plant or lab.

Initial Conditions: Given:

- Unit 1 experienced a LOCA
- EOP E-1 is in progress and Safety Injection is reset
- Containment pressure is > 25 psig
- A MAGENTA path on the Containment Critical Safety Function Status Tree has been confirmed
- All higher priority critical safety functions have been addressed

Initiating Cue: The Shift Foreman directs you to manually initiate containment spray in accordance with EOP FR-Z.1, starting at step 3.c

DO NOT READ TASK STANDARD TO EXAMINEE

Task Standard: Containment spray is manually initiated and aligned for injection phase in accordance with EOP FR-Z.1, Step 3 such that:

- **Containment Spray Pump 1-1 running with discharge valve 9001A OPEN**

And / Or

- **Containment Spray Pump 1-2 running with discharge valve 9001B OPEN**

Prior to the completion of FR-Z.1.

** Denotes Critical Step and Sub-Steps

Start Time: _____

	Step		Expected Operator Actions
1.	Obtain the correct procedure.	1.1	References EOP FR Z.1. ********** **Cue (if required): "Start with Step 3.c"** ********** **Step was: Sat _____ Unsat _____**

Comments:

2.	FR-Z.1, Step 3.c – Containment pressure greater than 22 psig.	2.1	Determines Containment Spray IS required - containment pressure is greater than 22 psig (PI-934, PI-935, PI-936, PI-937 on VB1) ********** ***If asked about ECA-1.1, provide the following:*** **Cue: "Refer to Initial Conditions."** ********** **Step was: Sat _____ Unsat _____**

Comments:

**	3.	FR-Z.1, Step 3.d - RNO Start the containment spray pumps.	**	3.1 Turns control switches to the START position for containment spray pumps 1-1 and 1-2 (VB1) **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
** 4.	FR-Z.1, Step 3.d - RNO Start the containment spray pumps.	** 4.1	Turns control switches to the START position for containment spray pumps 1-1 and 1-2 (VB1) **Step was: Sat _____ Unsat _____**

Comments:

** 5.	SFR-Z.1, step 3.e - Checks containment spray system for proper valve alignment.	5.1	Determines that Containment Spray System is NOT in proper emergency alignment based on Containment Spray Pump Discharge Valves 9001A and 9001B position indication lights (VB1): • Red lights OFF / Green Lights ON
		** 5.2	Takes control switch for 9001A and B to OPEN position and verifies valve position lights indicate OPEN (VB1): • Red lights ON / Green Lights OFF
		5.3	Verifies 8992 open.
		5.4	Verifies 8994A&B open. ********** **Cue: "Another operator will continue with the procedure".** ********** **Step was: Sat _____ Unsat _____**

Comments:

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

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Response: _____

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** Denotes Critical Step and Sub-Steps

- ❑ Initialize the simulator to IC-10 (100%, MOL).
- ❑ Enter Lesson File drl_1010.lsn.
- ❑ Perform the following:
  1. Place FCV-53 and 54 in RECIRC.
  2. Shut down condensate booster pump set 13, if running.
  3. Select CSF-5 on SPDS.
- ❑ After the simulator goes to FREEZE, Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet and has verified containment pressure greater than 22 psig (containment pressure lowers quickly from CFCU cooling once the simulator is taken to RUN).

Initial Conditions: Given:

- Unit 1 experienced a LOCA
- EOP E-1 is in progress and Safety Injection is reset
- Containment pressure is > 25 psig
- A MAGENTA path on the Containment Critical Safety Function Status Tree has been confirmed
- All higher priority critical safety functions have been addressed

Initiating Cue: The Shift Foreman directs you to manually initiate containment spray in accordance with EOP FR-Z.1, starting at step 3.c

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-LJCS6

Title: Crosstie of Vital BUS G to H

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform ____X____ Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References:	EOP ECA-0.3, Restore 4kV Buses, Appendix X and Appendix Q, Rev. 21	
Alternate Path:	Yes _____ No ____X____	
Time Critical:	Yes _____ No ____X____	
Time Allotment:	20 minutes	
Critical Steps:	2.1, 3.1, 5.2, 6.1, 7.1, 9.2, 10.1, 12.1, 12.2, 12.3, 13.1, 13.2, 13.3, 17.1	
Job Designation:	RO/SRO	
Rev Comments/LRN TIPS:	Bank LJC-032	
DCPP Task # / Rating:	573800	3.5
Gen KA # / Rating:	062.A4.07 – Ability to manually operate and/or monitor synchronizing and paralleling of different ac supplies in the control room.	3.1 / 3.1

AUTHOR: **LISA TORIBIO** DATE: **12/03/19**

OPERATIONS REPRESENTATIVE: **CHRISTOPHER MEHIGAN** DATE: **12/04/19**

REV.0

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the steps with which to begin.

Required Materials: Provide a copy of the reference procedure (partial procedure allowed), if the task is being done in the plant or lab.

Initial Conditions: Given:

- U-1 was operating at 100%.
- A reactor trip and safety injection has occurred concurrent with a loss of all off-site power.
- Diesel generator 11 and diesel generator 13 have failed due to lube oil pressure problems.
- Diesel generator 12 is supplying 4kV bus G.
- CCW Pp 12 has failed resulting in a complete loss of CCW flow.
- Steps 4.a and 4.b of ECA-0.3, Appendix X have been completed.

Initiating Cue: The Shift Foreman directs you to crosstie 4kV bus G to energize 4kV and 480V bus H per EOP ECA-0.3, Appendix X, commencing at step 4.c. The Shift Manager has concurred with this implementation.

DO NOT READ TASK STANDARD TO EXAMINEE

Task Standard: 4KV and 480 V bus H are energized from DG 1-2 in accordance with ECA-0.3, appendix X as by performing the following sequence:

- Step 4.c - Opens 52-HH-10.
- Step 4.d - Calls the operator in the field to open all 480V Bus H breakers.
- Step 4.f - Manually depresses both SI reset pushbuttons (Train A and Train B).
- Step 4.g - Places all Xfer to S/U PWR C/O toggle switches to CUT-OUT for Vital 4kV buses F, G, and H.
- Step 4.h - Depress all auto transfer reset pushbuttons for Vital 4kV buses F, G, and H.
- Step 4.j - Opens Startup Feeder Breakers 52-HF-14 and 52-HH-14.
- Step 4.k - Opens Startup Feeder 52-HG-15.
- Step 4.m – Inserts sync key for 4kV bus H start up feeder breaker and turns switch to on. Closes 4kV bus H start up feeder breaker 52-HH-14.
- Step 4.n – Inserts sync key for 4kV bus G start up feeder breaker and turns switch to on. Closes 4kV bus G start up feeder breaker 52-HG-14.
- Step 4.r – 4kV to 480V bus feeder breaker for bus H, 52-HH-10.

** Denotes Critical Steps and Sub-Steps

Start Time: _____

	Step		Expected Operator Actions
1.	Obtain the correct procedure.	1.1	References ECA-0.3, Appendix X, step 4.c. **Step was: Sat _____ Unsat _____**

Comments:

	Step		Expected Operator Actions
** 2.	Step 4.c - Verify OPEN the 4kV to 480 VAC bus feeder breaker for the de-energized bus to be reenergized	** 2.1	Opens 52-HH-10 (VB4).
		2.2	Verifies that 52-HH-10 has opened (VB4). **Step was: Sat _____ Unsat _____**

Comments:

	Step		Expected Operator Actions
** 3.	Step 4.d - On the de-energized 480V bus to be reenergized, open all 480V breakers.	** 3.1	Calls the operator in the field to open all 480V Bus H breakers. ***Note:* 480V Bus H breakers are in the correct OPEN position for this JPM. Inform the Examinee that Time Compression is being used.** ********** **Cue: "(using time compression) An Operator has opened all the 480V breakers on bus 1H."** ********** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Steps and Sub-Steps

	Step		Expected Operator Actions
4.	Step 4.e - Cut in the DIR PWR, LOSS OF FIELD, & BKR OC PROT RLYS for diesel generator 12.	4.1	Places D/G DIR PWR, LOSS OF FLD & BKR OC PROT RLYS C/O SW to CUT-IN (VB4). **Step was: Sat _____ Unsat _____**

Comments:

**	5.	Step 4.f - Reset SI.	5.1	Checks PK08-21 "Safety Injection Actuation" status (VB3).
			** 5.2	Manually depresses both pushbuttons.
			5.3	Checks at least one of the following: ❑ Monitor Light Box B "Safety Injection" red light OFF (VB1). OR ❑ PK08-21, "Safety Injection Actuation" not ON (VB3). **Step was: Sat _____ Unsat _____**

Comments:

**	6.	Step 4.g - Cutout the auto transfer FCOs for 4kV and 12kV buses.	** 6.1	Places all Xfer to S/U PWR C/O toggle switch to CUT-OUT (VB4, VB5). Vital 4kV: ❑ Bus F ** ❑ Bus G ** ❑ Bus H ** Non-Vital 4kV: ❑ Bus D ❑ Bus E 12 kV: ❑ Bus D ❑ Bus E **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Steps and Sub-Steps

	Step		Expected Operator Actions
** 7.	Step 4.h - Depress all auto transfer reset pushbuttons.	** 7.1	Depresses all AUTO XFER RESET pushbuttons, if required (VB4, VB5). Vital 4kV: ❑ Bus F ** ❑ Bus G ** ❑ Bus H ** Non-Vital 4kV: ❑ Bus D ❑ Bus E 12 kV: ❑ Bus D ❑ Bus E
		7.2	Verifies that all Auto Xfer indicating blue lights are off. (VB4, VB5).
			Step was: Sat _____ Unsat _____

Comments:

8.	Step 4.i - Verify OPEN all vital 4kV bus auxiliary feeder breakers.	8.1	Observes that all vital 4kV bus aux feeder breakers are OPEN (VB4): • 52-HH-13 OPEN • 52-HG-13 OPEN • 52-HF-13 OPEN
			Step was: Sat _____ Unsat _____

Comments:

** 9.	Step 4.j - Verify OPEN all vital 4kV bus startup feeder breakers.	9.1	Observes 52-HG-14 is OPEN (VB4).
		** 9.2	Opens Startup Feeder Breakers (VB4) • 52-HF-14 • 52-HH-14
			Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Steps and Sub-Steps

		Step			Expected Operator Actions
**	10.	Step 4.k - Verify OPEN the 4kV startup feeder breaker 52-HG-15.	**	10.1	Opens 52-HG-15 (VB4).
				10.2	Verifies that 52-HG-15 has opened

Step was: Sat _____ Unsat _____

Comments:

	11.	Step 4.l - Verify that Steps 4.b and 4.c of this appendix are complete.	11.1	Reads CAUTION and NOTE.

****

Cue: "Another operator will monitor the stability of the DG, and open the S/U feeder breaker if needed."

****

If requests status of steps 4.b and 4.c, provide the following cue:

Cue: "Refer to your initial conditions"

****

Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Steps and Sub-Steps

	Step		Expected Operator Actions
** 12.	Step 4.m - Close 4kV startup feeder breaker for the de-energized bus being reenergized.	** 12.1	Inserts sync key for 4kV bus H startup feeder breaker 52-HH-14 (VB4).
		** 12.2	Turns sync switch to ON.
		** 12.3	Closes 52-HH-14.
		12.4	Verifies that 52-HH-14 has closed.
			Step was: Sat _____ Unsat _____

Comments:

** 13.	Step 4.n - Close the 4kV startup feeder breaker for the bus that will be supplying power to the de-energized bus	** 13.1	Inserts sync key for 4kV bus G startup feeder breaker 52-HG-14 (VB4).
		** 13.2	Turns sync switch to ON.
		** 13.3	Closes 52-HG-14.
		13.4	Verifies that 52-HG-14 has closed.
		13.5	Verifies running diesel generator remains stable.
			Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Steps and Sub-Steps

	Step		Expected Operator Actions
14.	Step 4.o - Monitors for an SI	14.1	********** **Cue: "Another operator will monitor for an SI, and open the bus G S/U feeder if required."**
15.	Step 4.p - IMPLEMENT Appendix Q to start 4kV loads as needed on the reenergized bus	15.1	********** **Cue: "An operator has been stationed at VB4 with Appendix Q and is monitoring the diesel generator."** ********** **Cue: "The SFM will coordinate the starting of any 4KV loads that are required. Please continue with Appendix X."** ********** **Step was: Sat _____ Unsat _____**

Comments:

16.	Step 4.q - Verify that Step 4.d of this Appendix is complete PRIOR to performing the next step.	16.1	Verifies that Step 4.d of this Appendix is complete. ********** **Cue: "Steps 4.d of this appendix is complete."** ********** **Step was: Sat _____ Unsat _____**

Comments:

**	17.	Step 4.r - Close the 4kV to 480V bus feeder breaker for the reenergized bus.	**	17.1 Closes 52-HH-10. Verifies that 52-HH-10 has closed. **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Steps and Sub-Steps

	Step		Expected Operator Actions
18.	Step 4.s - Implement Appendix Q for starting 480V loads as needed.	18.1	Implements Appendix Q for starting 480V bus loads as needed. ********** **Cue: "The SFM will coordinate the starting of 480 vac loads that are required. Another operator will monitor and implement App Q."** ********** **Step was: Sat _____ Unsat _____**

Comments:

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Steps and Sub-Steps

Follow up Question Documentation:

Question: _____

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Response: _____

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** Denotes Critical Steps and Sub-Steps

- ❑ Restore the simulator to the IC-10 (100%, MOL).
- ❑ Enter lesson file drl_1032 or manually insert the following:
- ❑

Command	Description
Insert loa_sis3 OPEN delay=60 Insert loa_rhr10 OPEN delay=60 Insert loa_css8 OPEN delay=60 Insert loa_ccw31 OPEN delay=60 Insert loa_afw14 OPEN delay=60 Insert dsc_ven14 OPEN delay=60	Strips vital 4KV Bus H
Insert mal_deg1a 2 Insert mal_deg1c 2	Fails DGs 1-1 and 1-3
Insert mal_syd1 1 Insert mal_syd1_btw 1	Loss of Offsite Power
Insert mal_ppl2a 1 delIA mal_ppl2a 2 delay=2 insert mal_ppl2b 1 delIA mal_ppl2b 2 delay=2	Inadvertant SI
Insert pmp_ccw2 4 delay=4	OC trip on CCW PP 1-2
RUN	Runs simulator

- ❑ Run lesson drl_0063 (Strips 480v bus H). Manual insert is not practical due to large number of actions.
- ❑ Freeze simulator
- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet.

Initial Conditions: Given:

- U-1 was operating at 100%.
- A reactor trip and safety injection has occurred concurrent with a loss of all off-site power.
- Diesel generator 11 and diesel generator 13 have failed due to lube oil pressure problems.
- Diesel generator 12 is supplying 4kV bus G.
- CCW Pp 12 has failed resulting in a complete loss of CCW flow.
- Steps 4.a and 4.b of ECA-0.3, Appendix X have been completed.

Initiating Cue: The Shift Foreman directs you to crosstie 4kV bus G to energize 4kV and 480V bus H per EOP ECA-0.3, Appendix X, commencing at step 4.c. The Shift Manager has concurred with this implementation.

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-LJCS8

Title: Respond to Fire in the 480V Bus G Switchgear Room

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform ____X____ Simulate _____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

References:	OP AP-34.3.11, Fire Response – 480 V Bus G Switchgear Room, Rev 0	
Alternate Path:	Yes ____X____ No _____	
Time Critical:	Yes _____ No ____X____	
Time Allotment:	10 minutes	
Critical Steps:	4.1, 4.2, 4.3, 4.4, 4.9, 4.10	
Job Designation:	RO/SRO	
Rev Comments/LRN TIPS:	New	
DCPP Task # / Rating:	89481	3.0 / 3.0
Gen KA # / Rating:	067.AA2.17 – Ability to determine and interpret the following as they apply to the Plant Fire on Site: systems that may be affected by the fire.	3.5 / 4.3

AUTHOR: **LISA TORIBIO** DATE: **10/10/19**

OPERATIONS REPRESENTATIVE: **CHRISTOPHER MEHIGAN** DATE: **12/04/19**

REV. 0

Directions: All actions taken by examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. After identifying the appropriate procedure for the task, the examinee may be given the procedure and told the steps with which to begin.

Required Materials: OP AP-34.3.11, Fire Response – 480 V Bus G Switchgear Room, Rev 0

Initial Conditions: Given:

- A fire has been reported and verified as valid in the 480 V Bus G switchgear room.
- The crew has entered AP-34 and determined Fire Response procedure AP-34.3.11 applies..

Initiating Cue: The Shift Foreman directs you to implement OP AP-34.3.11, Fire Response – 480 V Bus G Switchgear Room.

NOTE: Do NOT provide examinee with Task Standard

Task Standard: **Realign charging as follows:**

- **CCP 1-3 - STOPPED**
- **Letdown isolated by one or more of the following:**
  - **Letdown isolation valve, LCV-459 - CLOSED**
  - **Letdown isolation valve LCV-460 - CLOSED**
  - **Letdown orifice stop valve 8149C - CLOSED**
- **Charging pump suction from the RWST, 8805A – OPENED**
- **VCT outlet to charging pumps, LCV-112B – CLOSED**
- **CCP 1-1 – RUNNING**

Prior to exiting OP AP-34.3.11, Fire Response – 480 V Bus G Switchgear Room

** Denotes Critical Step and Sub-Steps

Start Time: _____

Step	Expected Operator Actions
1. AP-34.3.11, Step 1 - Check reactor does NOT trip and Safety Injection does NOT actuate.	1.1 Noted reactor was NOT tripped and Safety Injection had NOT actuated.
	Step was: Sat _____ Unsat _____

Comments:

NOTE: This is a continuous action step. The running charging pump will begin cavitating shortly after the original check, requiring the candidate to return to step 2 to implement RNO actions.

2. AP-34.3.11, Step 2 - Check suction to running charging pumps.	2.1 Determined VCT level and pressure in normal band.
	2.2 Identified charging pump suction flow path available through LCV-112B and LCV-112C.
	2.3 Checked charging pump 1-3 amps stable.
	2.4 Checked charging header flow FI-128A stable.
	2.5 Checked charging header pressure PI-142A stable.
	Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
3.	AP-34.3.11, Step 3 - Check RWST drain path isolated.	3.1	Checked PK08-21 OFF.
			NOTE: AR PK05-01, 02, 03, 04 alarm shortly after CCP 1-3 cavitation begins.
		3.2	Noted reduced flow to RCP seals.
		3.3	Identified CCP 1-3 amps – NOT stable.
			Step was: Sat _____ Unsat _____

Comments:

<< Alternate Path – Start Point >>

**	4.	AP-34.3.11, Step 2 RNO – Align charging pump suction to RWST.	** 4.1	Stopped CCP 1-3.
				NOTE: Closing any combination of the following valves will isolate letdown.
			** 4.2	Isolated letdown by closing isolation and/or orifice valves: • LCV-459 and/or • LCV-460 and/or • 8149 C
			** 4.3	Opened charging pump suction from the RWST: • 8805A
			** 4.4	Closed VCT outlet to the charging pumps: • LCV-112B
			4.5	Informs Shift Foreman CCP 1-3 must be vented prior to restart.
			4.6	********** **Cue: "CCP 1-3 will be vented prior to restarting the pump"** **********

(Step continued on next page)

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
**	4. (cont) AP-34.3.11, Step 2 RNO – Align charging pump suction to RWST.	4.7	Checked charging pump recirc isolation lines 8105 and 8106 are open.
		4.8	Closed charging flow control valve FCV-128
		** 4.9	Started CCP 1-1
		** 4.10	Opened FCV-128 to establish minimum charging flow to seals only (approx 32 gpm; 8gpm/seal)
		4.11	Noted requirement to establish letdown per OP AP-17, Loss of Charging
	<< Alternate Path – End Point >>		
		4.12	********** **Cue: "Other Operators will continue with system restoration."** **********
			Step was: Sat _____ Unsat _____

Comments:

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

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Response: _____

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** Denotes Critical Step and Sub-Steps

- ❑ Restore the simulator to IC-10 (100%, MOL).
- ❑ Enter Lesson file L181-LJCS8

Description	**L3 Commands**
Activate PK10-10 Fire Detected	Insert PK1010_0674 FAIL_TO_TRUE
Cavitate CCP 1-3	insert CVC_932TASTEM 0.1 ramp=4

- ❑ Inform the examiner that the simulator setup is complete.
- ❑ Go to RUN when the examinee is given the cue sheet.

Initial Conditions: Given:

- A fire has been reported and verified as valid in the 480 V Bus G switchgear room.
- The crew has entered AP-34 and determined Fire Response procedure AP-34.3.11 applies..

Initiating Cue: The Shift Foreman directs you to implement OP AP-34.3.11, Fire Response – 480 V Bus G Switchgear Room.

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-P1

Title: Transfer Pressurizer Heater Group 23 to Backup Power

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform _____ Simulate ____X____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (Note: Any Unsat step requires a numbered comment; use back as needed.)

This is a Unit 2 JPM

References:	U2 OP A-4A:I, Pressurizer - Make Available, Rev. 26	
Alternate Path:	Yes _____ No ____X____	
Time Critical:	Yes _____ No ____X____	
Time Allotment:	15 minutes	
Critical Steps:	4.2, 8.2, 10.1	
Job Designation:	RO/SRO	
Rev Comments/LRN TIPS:	Bank: LJP-029A	
DCPP Task # / Rating:	109800	3.6
Gen KA # / Rating:	010.A2.01 – Ability to predict the impact of heater failures on the PZR PCS and based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations.	3.3 / 3.6

AUTHOR: **LISA TORIBIO** DATE: **12/05/19**

APPROVED BY: **CHRIS MEHIGAN** DATE: **12/05/19**
LINE MANAGER

REV.0

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Equipment operation "Cues" are contingent on proper operation by the examinee and should be "adjusted" should equipment operation differ from expected.

Required Materials: A copy of U2 OP A-4A:I, Section 6.4.

Initial Conditions: Given:

- Unit 2 is in MODE 1.
- An electrical fault has deenergized 480VAC bus 23E.
- Offsite power is available

Initiating Cue: The Shift Foreman directs you to transfer pressurizer heater group 23 to its backup power supply in accordance with OP A-4A:I, Section 6.4.

NOTE: Do NOT provide examinee with Task Standard

Task Standard: Pressurizer heater group 2-3 is powered from its backup supply as follows:

- Control power toggle switch in **OFF** position
- Transfer switch EPPH23 in **DOWN** (backup) position
- DC control power knife switch 72-52-2H-74 - **CLOSED**

** Denotes Critical Step and Sub-Steps

Start Time: _____

Step	Expected Operator Actions
1. Reference procedure section 6.4	1.1 Read caution and note. ********** **Cue: "Another Operator has been assigned to monitor the loading of Bus H 480V transformer."** ********** 1.2 Went to step 6.4.2 for Pzr Heater Group 2-3. 1.3 Read caution. 1.4 Recognized that off-site power is available and went to Section 6.4.2b. **Step was: Sat _____ Unsat _____**

Comments:

2. OP A-4A:I, Step 6.4.2.b.1,2 – Place control switch for heater group 23 in the OFF position.	2.1 Went to or called the control room to ensure the position of the control switch for heater group 23 is in OFF. ********** **Cue: "The control switch for heater group 23 is in the OFF position and the green light is ON."** ********** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
3.	OP A-4A:I, Step 6.4.2.b.3.a – Ensure that heater group 23 normal breaker 52-23E-2 is OPEN.	3.1	Located the normal breaker for heater group 23 on load center 23E.
		3.2	Ensured that the breaker is OPEN. ********** **Cue: "The OPEN (green) indicator is showing on the breaker."** ********** **Step was: Sat _____ Unsat _____**

Comments:

**	4.	OP A-4A:I, Step 6.4.2.b.3.b – Place the DC control power switch 72-52-23E-02 for pzr heater group 23 normal breaker in OFF position.	4.1	Located the DC control power switch for the heater group 23 normal breaker on load center 23E.
			** 4.2	Placed the control power toggle switch in the OFF position. ********** **Cue: "The toggle switch is in the DOWN (OFF) position."** ********** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

Step		Expected Operator Actions	
5.	OP A-4A:I, Step 6.4.2.b.4.a-Check heater group 23 backup breaker 52-2H-74 open.	5.1	Located the heater group 23 backup breaker.
		5.2	Checked that the breaker is open. *** **Cue: "The OPEN (green) indicator is showing on the breaker."** *** **Step was: Sat _____ Unsat _____**

Comments:

6.	OP A-4A:I, Step 6.4.2.b.4.b - Check open the DC control power knife switch 72-52-2H-74 for the heater group 23 backup breaker.	6.1	Located the DC control power knife switch for heater group 23 (located above the vital breaker). *** **Cue: "You may open the cabinet."** ***
		6.2	Ensured the knife switch is open. *** **Cue: "The knife switch is open."** *** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
7.	OP A-4A:I, Step 6.4.2.b.5.a - Ensure both white potential lights on manual transfer switch EPPH23, Press Heater 2-3 Transfer Switch are OFF.	7.1	Located the manual transfer switch on the wall next to the 52-2H-74 breaker.
			Note: Normal breaker may be available, white light may be ON.
		7.2	Checked BOTH white lights OFF • Normal supply 52-23E-2 • Backup supply 52-2H-74 ** **Cue: "Both white lights are OFF."** ** **Step was: Sat _____ Unsat _____**

Comments:

** 8.	OP A-4A:I, Step 6.4.2.b.5.b,c - Move the transfer switch down to the backup (vital bus) position.		** **Cue: "Another Operator will complete all required sealed component change forms and re-sealing."** **
		8.1	Simulated removing seal.
		** 8.2	Positioned switch EPPH23 to the backup supply. *** **Cue: "The transfer switch is in the DOWN (backup) position."** *** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
9.	OP A-4A:I, Step 6.4.2.b.6.a - Rack in or check racked in 52-2H-74.		***Note:*** ***This breaker is normally racked in. This step would become critical if the breaker were initially racked out. OP J-7A:II would only be needed in this "unusual" case.***
		9.1	Racked in or checked racked in 52-2H-74. ********** **Cue: "Breaker is flush with the breaker cabinet (RACKED IN)."** ********** **Step was: Sat _____ Unsat _____**

Comments:

**	10.	OP A-4A:I, Step 6.4.2.b.6.b - Close the DC control power knife switch for the heater group 23 backup breaker.	**	10.1 Closed the DC control power knife switch 72-52-2H-74. ********** **Cue: "The knife switch is closed."** ********** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
11.	OP A-4A:I, Step 6.4.2.b.6.c,d - Ensure the DC Charging Power Switch for heater group 23 backup breaker (52-2H-74) is on and springs charged.	11.1	Located the DC Charging Power Switch on the lower front of 52-2H-74.
		11.2	Ensured the following: • CHARGING POWER switch is in the ON position • SPRINGS CHARGED flag displayed ** **Cue: "The switch is in the ON position, and the 'Springs Charged' flag is showing on the breaker."** ** **Step was: Sat _____ Unsat _____**
Comments:			
12.	Notify the control room of the status of heater group 23.	12.1	Notified the control room that heater group 23 has been transferred to the backup power supply. ** **Cue: "The Control Operator will complete the procedure and energize heater group 23."** ** **Step was: Sat _____ Unsat _____**
Comments:			

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

_____

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Response: _____

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** Denotes Critical Step and Sub-Steps

Initial Conditions:

Given:

- Unit 2 is in MODE 1.
- An electrical fault has deenergized 480VAC bus 23E.
- Offsite power is available

Initiating Cue:

The Shift Foreman directs you to transfer pressurizer heater group 23 to its backup power supply in accordance with OP A-4A:I, Section 6.4.

6.4 Pressurizer Heaters - Transfer to Backup Power Supply

CAUTION: The load on 480V Vital Bus/Transformer shall be monitored when transferring Pressurizer heaters to the backup power supply. Pressurizer heaters ON and CFCUs in FAST speed could result in exceeding transformer normal rated load.[T03665/Ref 7.2.4]

NOTE: Red tick marks on transformer MW meter face indicate normal continuous rating value.

6.4.1 IF Press Heater Group 2-2 is to be transferred to the backup power supply, THEN perform the following:

CAUTION: Any safety injection signal must be reset before loads can be stripped and before the heaters can be energized. Safety injection signal may be reset only if applicable reset criteria is met in the specific Emergency Operating Procedures.[T03665]

a. IF 4kV Vital Bus G is being supplied by its diesel generator AND bus load is greater than or equal to 2.6 MW, THEN at SFM discretion, strip loads from the bus as follows:[T03665]

1. IF all containment fan coolers are running AND average containment air temperature is less than 120°F, THEN shut down ONE of the following:
   - CFCU 2-3

   OR
   - CFCU 2-5.

2. IF ALL component cooling water pumps are running THEN shut down CCW Pump 2-2.

3. IF the ECCS pump shutdown criteria in the applicable Emergency Operating Procedure is met, THEN shut down RHR Pump 2-2.

b. Energize Press Heater Group #22 from backup supply as follows:[T03665]

1. Place Backup Htr Grp 2-2 control switch in "OFF".

2. Check Backup Htr Grp 2-2 control switch green light ON.

3. Ensure the following for 52-23D-6, Press Heater Group #22:

   a) Breaker OPEN

   b) 72-52-23D-06, DC Control Power Cut Out Switch, in "OFF"

4. Ensure the following for 52-2G-72, Press Heater Group #22:

   a) Breaker OPEN

   b) 72-52-2G-72, DC Control Power knife switch, OPEN (above breaker inside SPGA)

5. Transfer EPPH22, Press Heater 2-2 Transfer Switch, as follows:

   a) Ensure that BOTH white potential indicating lights OFF.
   - Normal supply 52-23D-6
   - Backup supply 52-2G-72

   b) Place EPPH22 in "BACKUP".

   c) Seal EPPH22 in "BACKUP" PER OP1.DC20, "Sealed Components."

6. Ensure the following for 52-2G-72, Press Heater Group #22:

   a) Breaker RACKED IN and OPEN PER OP J-7A:II, "480V Non-Vital System - Switching Operation"[Ref 7.2.5]

   b) 72-52-2G-72, DC Control Power knife switch, CLOSED (above breaker inside SPGA)

   c) DC Charging Power switch in "ON" (lower front of breaker)

   d) Closing springs charged

CAUTION: The Pressurizer heater group breaker auto trip on low Pressurizer level is defeated when heaters are on backup power supply. Heaters must be manually turned OFF if Pressurizer level drops below 17%.

7. Place Backup Htr Grp 2-2 control switch in "AUTO" after "ON" (CC1).

NOTE: The indicating lights for this group will NOT illuminate since they are associated with the normal power supply breaker position.

8. Check Htr Grp 2-2 is energized by observing the kW meter (CC1).

9. IF Press Heater Group #22 is NOT energized
THEN manually close breaker 52-2G-72 as follows:[Ref. 7.2.3]

   a) Ensure Backup Htr Grp 2-2 control switch in "AUTO" after "ON".

NOTE: Charging the closing springs electrically requires the local DC Control Power knife switch (72-52-2G-72) above the breaker to be closed and the DC Charging Power toggle switch on the front of the breaker in "ON".

   b) Ensure breaker 52-2G-72 closing springs are charged.

   c) Press the CLOSE pushbutton.

10. Ensure that Diesel Generator 2-1 is NOT overloaded by referencing the capability curve in OP J-6B:IV, "Diesel Generators - Manual Operation of DG 2-1."

11. Check Bus G 4kV / 480V XFMR High Side mW are less than or equal to the red tick mark on meter face.

12. IF Bus G 4kV / 480V XFMR High Side mW are greater than red tick mark, THEN REFER TO AR PK17-22, "480V Bus 2G," for guidance on reducing loads.

6.4.2 IF Pzr Heater Group 2-3 is to be transferred to the backup power supply, THEN perform the following:

CAUTION: Any safety injection signal must be reset before loads can be stripped and before the heaters can be energized. Safety injection signal may be reset only if applicable reset criteria are met in the specific Emergency Operating Procedures.[T03665]

a. IF 4kV Vital Bus H is being supplied by its diesel generator AND bus load is greater than or equal to 2.6 mW, THEN at SFM discretion, strip loads from the bus as follows:[T03665]

1. IF all containment fan coolers are running AND average containment air temperature is less than 120°F, THEN shut down CFCU 2-4.

2. IF ALL component cooling water pumps are running, THEN shut down CCW Pump 2-3.

3. IF the ECCS pump shutdown criteria in the applicable Emergency Operating Procedure are met, THEN
   - Shut down RHR Pump 2-2
   - Shut down SI Pump 2-2

b. Energize Pzr Heater Group 2-3 from backup supply as follows:[T03665]

1. Place Backup Htr Grp 2-3 control switch in "OFF" (CC1).

2. Check Backup Htr Grp 2-3 control switch green light ON.

3. Ensure the following for 52-23E-2, Press Heater Group #23:

   a) Breaker OPEN

   b) 72-52-23E-02, DC Control Power Cut Out Switch, in "OFF"

4. Ensure the following for 52-2H-74, Press Heater Group #23:

   a) Breaker OPEN

   b) 72-52-2H-74, DC Control Power knife switch, OPEN (above breaker inside SPHA)

5. Transfer EPPH23, Press Heater 2-3 Transfer Switch, as follows:

   a) Check BOTH of the following white potential indicating lights OFF:
      - Normal supply 52-23E-2
      - Backup supply 52-2H-74

   b) Place EPPH23 in "BACKUP".

   c) Seal EPPH23 in "BACKUP" per OP1.DC20, "Sealed Components."

6. Ensure the following for 52-2H-74, Press Heater Group #23:

   a) Breaker RACKED IN and OPEN PER OP J-7A:II, "480V Non-Vital System - Switching Operation"[Ref 7.2.5]

   b) 72-52-2H-74, DC Control Power knife switch, CLOSED (above breaker in SPHA)

   c) DC Charging Power switch in "ON" (lower front of breaker)

   d) Closing springs charged

CAUTION: The Pressurizer heater group breaker auto trip on low Pressurizer level is defeated when heaters are on backup power supply. Heaters must be manually turned OFF if Pressurizer level drops below 17%.

7. Place Backup Htr Grp 2-3 control switch in "AUTO" after "ON" (CC1).

NOTE: The indicating lights for this group will NOT illuminate since they are associated with the normal power supply breaker position.

8. Check Htr Grp 2-3 is energized by observing the kW meter (CC1).

9. IF Press Heater Group 2-3 is NOT energized,
   THEN manually close breaker 52-2H-74 as follows:[Ref 7.2.3]

   a) Ensure Backup Htr Grp 2-3 control switch in "AUTO" after "ON".

NOTE: Charging the closing springs electrically requires the local DC Control Power knife switch (72-52-2H-74) above the breaker to be closed and the DC Charging Power toggle switch on the front of the breaker in "ON".

   b) Ensure 52-2H-74 closing springs are charged.

   c) Press the CLOSE pushbutton.

10. Ensure Diesel Generator 2-2 is NOT overloaded by referencing the capability curve in OP J-6B:V, "Diesel Generators - Manual Operation of DG 2-2."

11. Check Bus H 4kV / 480V XFMR High Side mW are less than or equal to the red tick mark on meter face.

12. IF Bus H 4kV / 480V XFMR High Side mW are greater than red tick mark, THEN REFER TO AR PK16-22, "480V Bus 2H," for guidance on reducing loads.

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: LNRCL181-P2

Title: Transfer the TSC to Vital Power

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform _____ Simulate ____X____

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments:

This is a Unit 1 JPM

References:	EOP ECA-2.1, Uncontrolled Depressurization of All Steam Generators, Appendix J, Rev. 27A OP J-6B:VI, Manual Operation of DG 1-3, Unit 1 – Rev. 37 OP J-6B:VI, Manual Operation of DG 2-3, Unit 2 – Rev. 33
Alternate Path:	Yes ____X____ No _____
Time Critical:	Yes _____ No ____X____
Time Allotment:	20 minutes
Critical Steps:	3.1, 4.1, 7.1, 7.2
Job Designation:	RO/SRO
Rev Comments/LRN TIPS:	Converted to new format, updated references. Rev 2A for reference procedure number revision only – no impact to JPM. LOF supervisor approves.
DCPP Task # / Rating:	896600 3.0 / 3.0
Gen KA # / Rating:	062.A2.11 – Ability to predict the impact of aligning standby equipment with correct emergency power source on the ac distribution system and based on those predictions, use procedures to correct, control, or mitigate the consequences of those malfunctions or operations. 3.7 / 4.1

AUTHOR: **LISA TORIBIO** DATE: **12/03/19**

OPERATIONS REPRESENTATIVE **CHRISTOPHER MEHIGAN** DATE: **12/05/19**

LINE MANAGER

REV. 0

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Equipment operation "Cues" are contingent on proper operation by the examinee and should be "adjusted" should equipment operation differ from expected.

Required Materials: Copy of ECA-2.1, Appendix J.

Copy of OP J-6B:VI for D/G 1-3 and 2-3. (only once asked for)

Initial Conditions: Given:

- Unit 1 experienced a steam break and uncontrolled depressurization of all steam generators.
- Offsite power was lost to both units.
- The SEC has given permission to place the TSC on vital power.
- The TSC is manned and requires vital power.
- Diesel generator 1-3 is supplying Unit 1 4 kV Bus F and is carrying 2.12 MW load @ a 0.8 pf.
- Diesel generator 2-3 is supplying Unit 2 4 kV Bus F and is carrying 2.26 MW load @ a 0.8 pf.

Initiating Cue: The Unit 1 Shift Foreman directs you to place the TSC on U-1 vital power, per ECA-2.1, Appendix J, starting with Step 3.

NOTE: Do NOT provide examinee with Task Standard

Task Standard: TSC Transfer Switch Normal Power:

- **Breaker 52-22J-40 in the OFF position.**

TSC is being provided power from Unit 2 D/G 2-3 via:

- **Switch EPTSN to BACKUP power.**
- **Switch EPTSC to the NORMAL (U-2) position.**
- **Breaker 52-2F-47 in the ON position.**

** Denotes Critical Step and Sub-Steps

Start Time:

	Step		Expected Operator Actions
1.	ECA-2.1, Appendix J, Step 3 – Check D/G 1-3 loaded and able to support additional loading.	1.1	Referenced D/G 1-3 load in initial conditions.
		1.2	Referenced OP J-6B:VI, Precautions and Limitations Step 5.10 for D/G 1-3 load limits.
			Note: ***Supply copy of procedure OP J-6B:VI P&Ls to student when they indicate they will refer to a procedure for D/G load limits.***
		1.3	Determined that D/G 1-3 can support additional 106.2 KW loading. (2.6 Mw – 2.12 MW = .48 MW or 480 KW)
			Step was: Sat _____ Unsat _____

Comments:

			Note: ***Examinee may elect to evaluate support capability of D/G 2-3 at this time, but is expected to align the TSC to D/G 1-3 per Shift Foreman directions given in cue. Mark Step N/A if evaluation of D/G 2-3 not performed at this time.***
2.	ECA-2.1, Appendix J, Step 3 – Check D/G 2-3 loaded and able to support additional loading (Optional step since D/G 1-3 is capable of carrying load).	2.1	Referenced OP J-6B:VI, Precautions and Limitations Step 5.10 for D/G 2-3 load limits.
		2.2	Determined DG 2-3 has room for an additional 106.2 KW of load (2.6 Mw – 2.26 MW = .34 MW or 340 KW)
			Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
			Note: ***JPM steps 3.1, 3.2, and 3.3 may be done in any order (bulleted steps in the procedure).***
** 3.	ECA-2.1, Appendix J, Step 5 – Open the following breakers: • Open breaker 52-22J-40 (TSC XFER SW)	** 3.1	Placed breaker 52-22J-40 (EPTSN TSC PWR TRANSF SW NORMAL SOURCE) in the OFF position. ********** **Cue: "An audible "clunk" is heard, and the breaker is in the down position with the word OFF showing on the lower breaker handle."** **********
	• Open breaker 52-2F-47 (TSC 480V POWER TO EPTSC)	3.2	Noted that breaker 52-2F-47 (ON SITE TECHNICAL SUPPORT CENTER 480V POWER TO EPTSC) is in the OFF position. ********** **Cue: "The breaker is in the down position with the word OFF showing on the lower breaker handle."** **********
	• Open breaker 52-1F-67 (TSC TRANSFER SWITCH)	3.3	Noted that breaker 52-1F-67 (TSC TRANSFER SWITCH) is in the OFF position. ********** **Cue: "The breaker is in the down position with the word OFF showing on the lower breaker handle."** ********** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
			Note: ***Switch is on west wall of 2F 480 VAC switchgear room.***
** 4.	ECA-2.1, Appendix J, Step 6 – Switch EPTSN to BACKUP power.	** 4.1	Placed switch EPTSN in the BACKUP position. ********** **Cue: "The sealed component change form needs will be addressed by another Operator."** ********** ********** **Cue: "The switch is in the BACKUP position."** ********** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

Step	Expected Operator Actions
5. ECA-2.1, Appendix J, Step 7 – Supply Power from Unit 1: a) Switch EPTSC, Power Transfer Unit Selector Switch to BACKUP.	5.1 Placed EPTSC switch (TSC Power Transfer Unit Selector Switch) to the BACKUP position. ********** **Cue: "The sealed component change form needs will be addressed by another Operator."** ********** ********** **Cue: "The switch is in the BACKUP position."** ********** ***Note:* When the Examinee attempts to close the breaker to align power from Unit 1, the breaker WILL NOT CLOSE. The Examinee should recognize aligning TSC to Unit 2 as a viable alternative.*** 5.2 Attempted to place breaker 52-1F-67 in the ON position. ********** **Cue: "The breaker REMAINS AS IS with the word OFF showing on the lower breaker handle."** ********** 5.3 Determined Unit 1 is not capable of supplying power to TSC. **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

<< Alternate Path – Start Point >>

Step	Expected Operator Actions
	Note: ***If Examinee requests direction from Control Room due to original field alignment becoming unavailable, provide the following cue:***
	********** ***Cue: "Take the appropriate action"*** **********
	Note: ***Mark step N/A if evaluation of D/G 2-3 load support was performed earlier.***
6. ECA-2.1, Appendix J, Step 4 – Check D/G 2-3 loaded AND able to support an additional 106.2 KW loading.	6.1 Referenced OP J-6B:VI, Precautions and Limitations Step 5.10 for D/G 2-3 load limits.
	6.2 Determined that DG 2-3 has room for an additional 106.2 KW of load (2.6 MW – 2.26 MW = .34 MW or 340 KW)
	Step was: Sat _____ Unsat _____

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
			Note: Switch is also on west wall of 2F 480VAC switchgear room, next to EPTSN switch. Unit 2 is the NORMAL position
** 7.	ECA-2.1, Appendix J, Step 8 – Supply Power from Unit 2: a) Switch EPTSC, Power Transfer Unit Selector Switch to NORMAL.	** 7.1	Places EPTSC switch (TSC Power Transfer Unit Selector Switch) to the NORMAL position. ********** **Cue: "The switch is in the NORMAL position."** **********
	b) Close 52-2F-47, TSC 480V Power to EPTSC.	** 7.2	Places breaker 52-2F-47 in the ON position. ********** **Cue: "An audible "clunk" is heard, and the breaker is in the up position with the word ON showing on the upper breaker handle."** ********** **Step was: Sat _____ Unsat _____**

<< Alternate Path – End Point >>

Comments:

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

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Response: _____

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** Denotes Critical Step and Sub-Steps

Initial Conditions: Given:

- Unit 1 experienced a steam break and uncontrolled depressurization of all steam generators.
- Offsite power was lost to both units.
- The SEC has given permission to place the TSC on vital power.
- The TSC is manned and requires vital power.
- Diesel generator 1-3 is supplying Unit 1 4 kV Bus F and is carrying 2.12 MW load @ a 0.8 pf.
- Diesel generator 2-3 is supplying Unit 2 4 kV Bus F and is carrying 2.26 MW load @ a 0.8 pf.

Initiating Cue: The Unit 1 Shift Foreman directs you to place the TSC on U-1 vital power, per ECA-2.1, Appendix J, starting with Step 3.

APPENDIX J

TSC ELECTRICAL POWER

1. Check that the TSC is being manned and that vital power is required.

> **NOTE:** Aligning TSC power supply to a vital bus renders the D/G associated with that bus inoperable due to the addition of 106.2 KW of load to the bus.

2. Obtain the SEC's permission prior to placing the TSC on vital power.
3. Check D/G 1-3 OR 2-3 loaded AND able to support an additional 106.2 KW loading.
4. IF one of the D/Gs is unable to support the additional loading,
   THEN supply power from the other unit.
5. Open the following breakers:
   - 52-22J-40 TSC XFER SW
   - 52-2F-47 TSC 480V POWER TO EPTSC
   - 52-1F-67 TSC TRANSFER SWITCH
6. In the 2F MCC Room, switch EPTSN, TSC Power Transfer Switch, to BACKUP.
7. To supply power from Unit 1:
   a. Switch EPTSC, TSC Power Transfer Unit Selector Switch, to BACKUP.
   b. Close 52-1F-67
8. To supply power from Unit 2:
   a. Switch EPTSC, TSC Power Transfer Unit Selector Switch, to NORMAL.
   b. Close 52-2F-47.

5.10 Do not violate the following limits during normal steady-state operation:

- Maximum continuous generator current: 451 amperes
- Maximum stator temperature: 240°F
- Minimum lube oil pressure: 60 psig
- Maximum lube oil temperature: 195°F
- Maximum jacket water temperature: 185°F
- Power factor: 1.0 to 0.8 lag
- Load: 2.60 MW at 0.8 power factor

5.11 Do not operate more than one DG at a time paralleled to any transformer (startup or unit auxiliary) in MODE 1, 2, 3, or 4. REFER TO SR 3.8.1.3, Note 3.

5.12 DGs are highly responsive to the starting of large motor loads, such as a 12kV pump, a condensate and booster pump set, or the No. 2 Heater Drain Pump. If the MVAR output is not reduced prior to starting such loads, a DG could exceed its kVA rating. If, while a DG is paralleled and at full load, a large motor load is to be started, first reduce MVAR output to 0.5 MVAR or less until after the load has been started.[Ref 7.2]

5.13 Prior to paralleling DG 1-3 to the bus, the DG 1-3 Mode Sel switch on VB4 shall be verified in "MANUAL".

5.14 Control power selection (EQD Panel):

- In MODES 1-4: DG 1-3 shall have its normal DC source energized and selected. If the backup source is selected, DG 1-3 is considered INOPERABLE and either DG 1-3 or 1-1 must be selected to MANUAL to prevent making Battery 1-3 INOPERABLE.
- In MODES 5, 6, and DEFUELED: Preferred alignment is for DG 1-3 to have its normal DC source energized and selected. If cross-tie capability exists (i.e., capability of supplying power to the battery charger aligned to DG 1-3 DC source), DG 1-3 and Battery 1-3 can still be considered OPERABLE with the backup source selected.

5.15 Crankcase exhausters should be operating while the engine is running. If not, DG 1-3 is still OPERABLE, but a notification shall be initiated and repairs made in a timely fashion. If crankcase exhausters are not running, DG 1-3 may experience more oil leakage from the block than normal.

5.16 If the lubricating oil temperature is below 90°F, DG 1-3 should not be started unless engineering has evaluated the condition.

5.17 Starting air header and turbo air header pressures should be monitored:

- Starting air: 140-160 psig
- Turbo air: Above 210 psig

5.10 Do not violate the following limits during normal steady-state operation:

- Maximum continuous generator current: 451 amperes
- Maximum stator temperature: 240°F
- Minimum lube oil pressure: 60 psig
- Maximum lube oil temperature: 195°F
- Maximum jacket water temperature: 185°F
- Power factor: 1.0 to 0.8 lag
- Load: 2.60 MW at 0.8 power factor

5.11 Do not operate more than one DG at a time paralleled to any transformer (startup or unit auxiliary) in MODE 1, 2, 3, or 4. REFER TO SR 3.8.1.3, Note 3.

5.12 DGs are highly responsive to the starting of large motor loads, such as a 12kV pump, a condensate and booster pump set, or the No. 2 Heater Drain Pump. If the MVAR output is not reduced prior to starting such loads, a DG could exceed its kVA rating. If, while a DG is paralleled and at full load, a large motor load is to be started, first reduce MVAR output to 0.5 MVAR or less until after the load has been started.[Ref 7.2]

5.13 Prior to paralleling DG 2-3 to the bus, the DG 2-3 Mode Sel switch on VB4 shall be verified in "MANUAL".

5.14 Control power selection (EQD Panel):

- In MODES 1-4: DG 2-3 shall have its normal DC source energized and selected. If the backup source is selected, DG 2-3 is considered INOPERABLE and either DG 2-3 or 2-2 must be selected to MANUAL to prevent making Battery 2-3 INOPERABLE.
- In MODES 5, 6, and DEFUELED: Preferred alignment is for DG 2-3 to have its normal DC source energized and selected. If cross-tie capability exists (i.e., capability of supplying power to the battery charger aligned to DG 2-3 DC source), DG 2-3 and Battery 2-3 can still be considered OPERABLE with the backup source selected.

5.15 Crankcase exhausters should be operating while the engine is running. If not, DG 2-3 is still OPERABLE, but a notification shall be initiated and repairs made in a timely fashion. If crankcase exhausters are not running, DG 2-3 may experience more oil leakage from the block than normal.

5.16 If the lubricating oil temperature is below 90°F, DG 2-3 should not be started unless engineering has evaluated the condition.

5.17 Starting air header and turbo air header pressures should be monitored:

- Starting air: 140-160 psig
- Turbo air: Above 210 psig

NUCLEAR POWER GENERATION

DIABLO CANYON POWER PLANT

JOB PERFORMANCE MEASURE

Number: NRCL181-P3

Title: Clear Component Cooling Water Header "A"

Examinee: _____

Evaluator: _____ _____ _____
Print Signature Date

Testing Method: Perform _____ Simulate X

Results: Sat _____ Unsat _____ Total Time: _____ minutes

Comments: (Note: Any Unsat step requires a numbered comment; use back as needed.)

References:	OP AP SD-4, Loss of Component Cooling Water, Rev 23, Appendix A OVID 106714-02	
Alternate Path:	Yes _____ No X	
Time Critical:	Yes _____ No X	
Time Allotment:	15 minutes	
Critical Steps:	1.4, 2.3, 3.3	
Job Designation:	RO/SRO	
Rev Comments/LRN TIPS:	New	
DCPP Task # / Rating:	-	-
Gen KA # / Rating:	G2.1.30 – Ability to locate and operate components, including local controls.	4.4 / 4.0

AUTHOR: **LISA TORIBIO** DATE: **10/01/19**

OPERATIONS REPRESENTATIVE: **CHRISTOPHER MEHIGAN** DATE: **12/06/19**

REV. 0

Directions: **No plant controls or equipment are to be operated during the performance of this Job Performance Measure.** All actions taken by examinee should be clearly demonstrated and verbalized to the evaluator. The examinee will be given the initial conditions and initiating cue. The task standard will NOT be read to the examinee. The examiner will then ask if any clarifications are needed. The examinee should be given the "required materials" shown below, and access to other plant references as appropriate.

Equipment operation "Cues" are contingent on proper operation by the examinee and should be "adjusted" should equipment operation differ from expected.

Required Materials: Provide a copy of the reference procedure (partial procedure allowed), if the task is being done in the plant or lab;

- OP AP SD-4, Appendix A
- OVID 106714-02

Initial Conditions: Given:

- Unit 1 is in Mode 5.
- The Control Room is currently implementing OP AP SD-4, Loss of Component Cooling Water, due to CCW system outleakage.
- Local inspection of CCW indicates the leak is between CCW Pump 1-1 discharge and CCW HX 1-1 outlet valve FCV-430.
- CCW HX 1-2 is currently in service.

Initiating Cue: The Shift Foreman directs you to isolate a portion of CCW Header "A" by performing OP AP SD-4, Appendix A, Step 1.a.1.

NOTE: Do NOT provide examinee with Task Standard

Task Standard: CCW Header "A" loads isolated as follows:

- **1-CCW-18, CCW Pump 1-1 Discharge to Header A - CLOSED**
- **1-CCW-19, CCW Pump 1-2 Discharge to Header A - CLOSED**
- **1-CCW-20, CCW Pump 1-3 Discharge to Header A - CLOSED**

** Denotes Critical Step and Sub-Steps

Start

Time: _____

	Step	Expected Operator Actions
**	1. OP AP SD-4, Appendix A, Step 1.a.1 – Close all three CCW pump discharge valves to CCW HX #1: • CCW-18	1.1 1-CCW-18 at the discharge of CCW Pump 1-1 (73' elevation aux building)
		1.2 Noted valve is sealed in the open position and will require seal component change forms. ********** **Cue: The Shift Foreman has assigned another operator to complete all required sealed component change forms and resealing.** **********
		1.3 Removed seal (simulated).
**		1.4 Rotated the handle until the arrow points to 0 degrees (simulated). ********** **Cue (if required): The valve is now positioned as you described.** ********** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
**	2. OP AP SD-4, Appendix A, Step 1.a.1 – Close all three CCW pump discharge valves to CCW HX #1 (cont): • CCW-19	2.1	1-CCW-19 at the discharge of CCW Pump 1-2 (73' elevation aux building)
		2.2	Removed seal (simulated).
		** 2.3	Rotated the handle until the arrow points to 0 degrees (simulated). ********** **Cue (if required): The valve is now positioned as you described.** ********** **Step was: Sat _____ Unsat _____**

Comments:

** Denotes Critical Step and Sub-Steps

	Step		Expected Operator Actions
**	3. OP AP SD-4, Appendix A, Step 1.a.1 – Close all three CCW pump discharge valves to CCW HX #1 (cont): • CCW-20	3.1	1-CCW-20 at the discharge of CCW Pump 1-3 (73' elevation aux building)
		3.2	Removed seal (simulated).
		** 3.3	Rotated the handle until the arrow points to 0 degrees (simulated). ********** **Cue (if required): The valve is now positioned as you described.** ********** **Step was: Sat _____ Unsat _____**

Comments:

If Candidate continues on in Appendix A

****

Cue: Another operator will complete isolation of CCW Header "A".

****

Stop Time: _____

Total Time: _____ (Enter total time on the cover page)

** Denotes Critical Step and Sub-Steps

Follow up Question Documentation:

Question: _____

_____

_____

_____

_____

_____

Response: _____

_____

_____

_____

_____

_____

_____

** Denotes Critical Step and Sub-Steps

Initial Conditions: Given:

Unit 1 is in Mode 5.

The Control Room is currently implementing OP AP SD-4, Loss of Component Cooling Water, due to CCW system outleakage.

Local inspection of CCW indicates the leak is between CCW Pump 1-1 discharge and CCW HX 1-1 outlet valve FCV-430.

CCW HX 1-2 is currently in service.

Initiating Cue: The Shift Foreman directs you to isolate a portion of CCW Header "A" by performing OP AP SD-4, Appendix A, Step 1.a.1.

APPENDIX A

Clearing a Component Cooling Water Header

This appendix provides guidance for clearing a CCW header due to a gross leak that CANNOT otherwise be ISOLATED. The operators must determine the leaking header and follow the steps below to clear it:

1. CLEARING HEADER "A"

a. IF the leak is determined to be between the pump discharge and CCW HX #1 Outlet valve FCV-430, check or place in service CCW HX #2,
THEN:

1) Close all three CCW pump discharge valves to CCW HX #1:
   - CCW-18
   - CCW-19
   - CCW-20

2) Close FCV-430.

3) Close the inlet valve to RE-17A, CCW-7.

b. IF the leak is determined to be downstream of FCV-430, check or place HX #2 in service, THEN:

1) Close FCV-430.

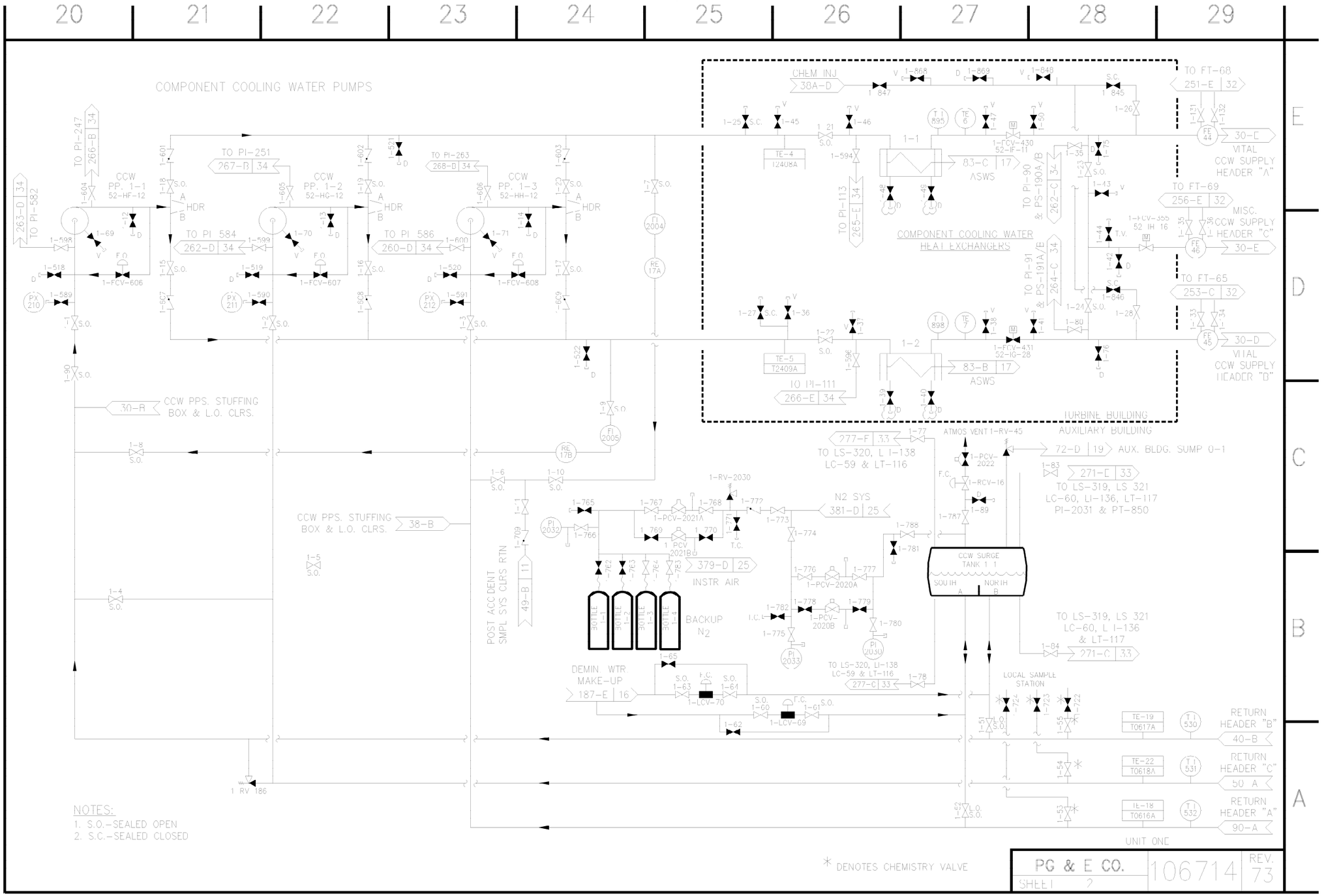
2) Close CCW HX #1 outlet header A-C crosstie valve CCW-23.

3) Start #1 and #2 CCW pumps if available. Shutdown #3 CCW pump.

4) Close header A-C suction crosstie valve CCW-5.

5) Isolate makeup water supply to the "A" header from the Surge Tank, CCW-52 (100 foot Pen area GW, 909 key).

6) Close the return valve from RE-17A, CCW-6.


COMPONENT COOLING WATER PUMPS
CCW PP. 1-1 52-HF-12
CCW PP. 1-2 52-HG-12
CCW PP. 1-3 52-HH-12
HDR
TO PI-247 266-B 34
263-D 34 TO PI-582
TO PI-251 267-B 34
TO PI-263 268-B 34
TO PI 584 262-D 34
TO PI 586 260-D 34
1-FCV-606
1-FCV-607
1-FCV-608
CHEM INJ 38A-D
TO FT-68 251-E 32
FE 44
30-E VITAL CCW SUPPLY HEADER "A"
TO FT-69 256-E 32
MISC. CCW SUPPLY HEADER "C"
1-FCV-355 52 1H 16
TO FT-65 253-C 32
FE 45
30-D VITAL CCW SUPPLY HEADER "D"
TE-4 T2408A
TE-5 T2409A
83-C 17 ASWS
83-B 17 ASWS
1-FCV-430 52-IF-11
1-FCV-431 52-IG-28
TO PI-90 & PS-190A/B
TO PI-91 & PS-191A/B
TO PI-113 265-E 34
TO PI-111 266-E 34
COMPONENT COOLING WATER HEAT EXCHANGERS
TURBINE BUILDING
AUXILIARY BUILDING
30-A CCW PPS. STUFFING BOX & L.O. CLRS.
38-B CCW PPS. STUFFING BOX & L.O. CLRS.
277-F 33 TO LS-320, L I-138 LC-59 & LT-116
ATMOS VENT 1-RV-45
72-D 19 AUX. BLDG. SUMP 0-1
271-E 33 TO LS-319, LS 321 LC-60, LI-136, LT-117 PI-2031 & PT-850
1-RV-2030
1-PCV-2021A
1-PCV-2021B
1-PCV-2020A
1-PCV-2020B
N2 SYS 381-D 25
INSTR AIR 379-D 25
BACKUP N2
CCW SURGE TANK 1-1
SOUTH A
NORTH B
POST ACCIDENT SMPL SYS CLRS RTN 49-B 11
DEMIN. WTR MAKE-UP 187-E 16
1-LCV-70
1-LCV-69
TO LS-320, LI-138 LC-59 & LT-116 277-C 33
TO LS-319, LS 321 LC-60, L I-136 & LT-117 271-C 33
LOCAL SAMPLE STATION
TE-19 T0617A
TE-22 T0618A
TE-18 T0616A
RETURN HEADER "B" 40-B
RETURN HEADER "C" 50 A
RETURN HEADER "A" 90-A
1 RV 186
NOTES:
1. S.O.-SEALED OPEN
2. S.C.-SEALED CLOSED
* DENOTES CHEMISTRY VALVE
UNIT ONE
PG & E CO.
SHEET 2
106714
REV. 73
SYS14\\\671402
(OP1.DC23 CONTROL)

Facility: Diablo Canyon (PWR) **Scenario No:** 1 **Op-Test No:** L181 NRC

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: **2% with MFW in service, aligned to Start-Up Power. MOL with CFCU 1-1 OOS.**

Turnover: **In OP L-3, performing step 6.28, raising power to 8%.**

Event No	Malf No.	Event Type*	Event Description (See Summary for Narrative Detail)
1	N/A	**R (ATC, SRO)**	Raise reactor power from 2% to ≈ 8% **OP L-3,** sec 6.28.
2	VLV_CVC22_2 .5 delay=0 ramp=15	**I (ALL)**	Regen Hx Isolation Valve, LCV-459, fails to mid-position (**OP AP-18**).
3	H_V1_034M_1, XMT_VEN6_3, XMT_VEN7_3, XMT_VEN8_3	**TS, C (BOP, SRO)**	CFCU 1-2 high stator/bearing temperature due to low CCW flow (**AR PK01-21, TS 3.6.6.C**).
4	RLY_PPL63_2 OPEN RLY_PPL59_2 OPEN	**TS, I (ALL)**	SSPS relay actuation causes inadvertent start of TDAFW pump and blowdown sample isolation valves to close (**AR PK04-03, OP D-1:III, OP1.DC10**; **TS 3.7.5.B**).
5	MAL_MSS4 1.57E+07 ramp=30	**M (ALL)**	MSLB outside containment.
6	VLV_MSS7_2, VLV_MSS8_2, VLV_MSS9_2, VLV_MSS10_2 1	**C (ALL)**	All MSIVs fail open; No manual close for FCV-42.
7	MAL_PPL3B BOTH	**C (BOP)**	Safety Injection, Train B fails to actuate.

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
1. Total malfunctions (5–8) (Events 2,3,4,5,6,7)	6
2. Malfunctions after EOP entry (1-2) (Events 6,7)	2
3. Abnormal events (1–4) (Events 2,3,4)	3
4. Major transients (1-2) (Event 5)	1
5. EOPs entered/requiring substantive actions (1–2) (E-2, E-1.1)	2
6. EOP contingencies requiring substantive actions (0–2)	0
7. Critical tasks (2–3)(See description below)	3

Critical Task	Justification	Reference
(S1CT-1) Shutdown TD AFW pump prior to Steam Generator Overfill (S/G wide range greater than 100%) by either: • Closing the LCVs to the individual S/Gs OR • Closing steam supply valves FCV-37 and FCV-38 to leads 1 and 2 respectively OR • Directing FCV-95 closed in the field	Carryover into the steam lines can result in damage to downstream piping and valves, placing the secondary heat sink at risk. High steam generator level can also result in reactivity excursions due to excessive cooldown of the primary system.	• Tech Spec 3.3.2 Basis Documentation
(S1CT-2) Stop uncontrolled RCS cooldown before a severe challenge to Integrity Safety Function develops (magenta path on F-0.4 RCS Integrity) as follows: • Verify FCV-42 closed (S/G 1-2 steamline isolation). • Close/verify closed S/G Blowdown isolation valves FCV-761, FCV-154, and FCV-248. • Verify all steam dumps closed. • Isolate feed flow to S/G 1-2 by closing/verifying closed LCV-107 and LCV-111. *(Note: LCV-107 is critical only when TDAFW pump is running or capable of an autostart).* • Isolate steam flow from S/G 1-2 by closing/verifying closed FCV-37. • Throttling Feed flow to S/Gs 1-1, 1-3, and 1-4 while maintaining the minimum heatsink requirements (435 gpm until S/G NR level is greater than 15% in one non-faulted S/G).	An event or series of events which leads to a relatively rapid and severe reactor vessel downcomer cooldown can result in a thermal shock to the vessel wall that may lead to a small flaw, which may already exist in the vessel wall, growing into a larger crack. The growth or extension of such a flaw may lead, in some cases (where propagation is not stopped within the wall), to a loss of vessel integrity	• Background Information for WOG Emergency Response Guideline
(S1CT-3) Terminate SI prior to rupture of PRT by closing 8801A/B and/or 8803A/B. *(Note: CT is met by closing either 8801A/B OR 8803A/B.)*	Failure to terminate ECCS flow when SI termination criteria are met results in overfill of the Pressurizer and the eventual rupture of the PRT. This constitutes the avoidable degradation of the RCS as a fission product barrier.	• Westinghouse Owner's Group WCAP-17711-NP
Per NUREG-1021, Appendix D, if an operator or crew significantly deviates from or fails to follow procedures that affect the maintenance of basic safety functions, those actions may form the basis of a CT identified in the post-scenario review.		

SCENARIO SUMMARY – NRC #1

1. Control rods are used to raise power from 2% to ≈ 8% **OP L-3, Secondary Plant Startup,** step 6.28**.** ATC operator complies with 1 step pull and wait procedural requirement while monitoring relevant controls and diverse indicators. Shift Foreman provides reactivity oversight.

2. Regen Hx Isolation Valve, LCV-459, drifts to mid-position causing letdown orifice valve 8149C to close. Shift Foreman enters **OP AP-18, Letdown Line Failure**. Excess Letdown is established per **OP B-1A:IV CVCS - Excess Letdown - Place In Service and Remove From Service.**

3. CFCU 1-2 has a loss of CCW flow due to debris migration causing stator and motor bearing temperatures to rise rapidly and bring in annunciator alarm **PK01-21, Contmt Fan Clr.** Reactor operators identify low flow indications on vertical boards and rapidly rising stator/bearing temperatures using plant process computer trends. The crew secures the CFCU to prevent motor damage and contacts maintenance/engineering for assistance. Shift Foreman enters **TS 3.6.6 Condition C,** one required CFCU system inoperable such that a minimum of two CFCUs remain OPERABLE (7 day).

4. SSPS relay actuation results in Turbine Driven AFW (TDAFW) Pump Steam Supply Isolation Valve, FCV-95, failing open and isolation of half of the blowdown sample valves inside and outside containment. S/G levels rise and RCS temperature lowers. FCV-95 cannot be closed and the crew must isolate the TDAFW Pump by closing the LCVs to the individual S/Gs or by closing steam supply valves FCV-37 and FCV-38 from leads 2 and 3 respectively, or by directing FCV-95 manually closed in the field **(S1CT-1) Shutdown TD AFW pump prior to Steam Generator Overfill**. Shift Foreman implements **TS 3.7.5.B, AFW System** for one AFW train inoperable (72 hrs).

5. A main steamline break develops downstream of the Main Steam Isolation Valves, outside containment. The crew identifies the need to isolate the Main Steam Isolation Valves and perform a safety injection (SI) based on pressurizer pressure and level lowering rapidly. Shift Foreman directs a reactor trip and SI and enters **EOP E-0, Reactor Trip or Safety Injection.**

6. Train B of Safety Injection fails to actuate, requiring the crew to perform numerous manual alignments and pump starts as part of **Appendix E. Appendix E. ESF Auto Actions, Secondary and Auxiliaries Status.**

7. All four main steam isolation valves fail open. Steam leads 1, 3, and 4 may be closed from the control room, but lead 2 (FCV-42) requires field action. The crew transitions to **EOP E-2, Faulted Steam Generator Isolation** to isolate S/G 1-2 and dispatches an operator to locally close FCV-42 as part of the critical task to stop the uncontrolled cooldown **(S1CT-2) Stop uncontrolled cooldown before a severe challenge (magenta path) develops on F-0.4 RCS Integrity.**

8. The crew transitions to **EOP E-1.1, SI Termination** where they complete the final critical task of the scenario (**S1CT-3) Terminate SI prior to rupture of PRT**.

The scenario is terminated once the final critical task is complete.

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 1 **Page** 1 **of** 15

Event Description: **Raise Power to 8%**

Time	Position	Applicant's Actions or Behavior
(OP L-3, "Secondary Plant Startup", starting at step 6.28)		
	SRO	• Reads NOTES prior to step 6.28.
	ATC	• (6.28) Slowly raises power to 8% by pulling control rods one step at a time.
	SRO	Provides reactivity oversight while raising power.
	BOP	• (6.29) Monitors feed/steam delta P (PI-509, VB3 or CC2, DFWCS HMI on CC3). • (6.30) Verifies that DFWCS maintains constant delta P during rise in power.
	SRO	• Reads NOTE prior to step 6.31.
Proceed to the next event once reactivity manipulation adequately observed and power raised 0.5%, per the lead examiner.		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 2 **Page** 2 **of** 15

Event Description: **Regen Hx Isolation Valve, LCV-459, Fails to mid-position**

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnoses charging flow problem from: • RCP seal flows lowering (due to controller throttling back) (VB2 meters, PPC). • Pzr level rising slowly (due to charging/letdown mismatch) (VB2 meters, PPC, CC2 recorder). • VCT level dropping slowly (VB2 recorder, PPC). • Dual position indication lights illuminated on mimic board for LCV-459 (VB2).
	SRO	• Implements **OP AP-18, "Letdown Line Failure".**
(OP AP-18, "Letdown Line Failure")		
	SRO/ATC	• (1) Ensures no load changes, heatups, or draindowns are in progress.
	SRO/BOP	• (2) Isolates letdown o Ensures Letdown Orifice Stop Valve, 8149C is closed (VB2). o Closes other Regen Heat Exchanger Inlet Valve, LCV-460 (VB2). o Verifies RHR to Letdown Flow Control Valve, HCV-133 (RHR Letdown) is closed (VB2).
	SRO/ATC	• (3) Checks for RCS Leakage – verifies that Pzr level and RCS press are both stable/rising (VB2, CC2, PPC).
	ATC	• (4) Reduces charging to minimum (RCP seals only), using FCV-128 (or HC-459D) and HCV-142 (approx. 8 gpm on RCP seals, with HCV-142 closed or near closed) (CC2).
	SRO/BOP	• (5) Establish Excess Letdown (see next page), per **OP B-1A:IV, "CVCS - Excess Letdown - Place In Service and Remove From Service", Section 6.1 "Place Excess Letdown in Service".**
	BOP	• (6) Contacts RP and Chemistry regarding Excess Letdown being placed in service.

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 2 **Page** 3 **of** 15

Event Description: **Regen Hx Isolation Valve, LCV-459, Fails to mid-position (continued)**

Time	Position	Applicant's Actions or Behavior
(OP B-1A:IV, "Place Excess Letdown in Service")		
	ALL	• (6.1.1) Verifies charging at minimum (seals only) (done, per previous step, or do now). o Reduces charging to minimum (RCP seals only), using FCV-128 and HCV-142 (approx. 8 gpm on RCP seals, with HCV-142 closed (or near closed).
	BOP	• (6.1.2) Contacts RP for rad conditions/posting.
Note: If Shift Manager asked about flushing or crew attempts to omit flush, provide the following cue: **CUE: "Excess letdown line flushing is necessary."**		
	BOP	• Reads NOTE regarding excess letdown line flushing. • (6.1.3) Performs letdown line flush: o (6.1.3.a) Contacts Aux Watch to check sufficient level in RCDT 1-1 to receive a 13% rise in level. o (6.1.3.b) Directs Aux Watch to monitor RCDT 1-1 level. o (6.1.3.c) Places CVCS-1-8143, Excess Letdown Flow Divert Valve, in "DIVERT" (VB2). • (6.1.4) Opens FCV-361, CCW to Excess Letdown HX (VB1). • (6.1.5) Verifies pot for HCV-123, Excess Letdown Pressure Control, is closed (at 0) (VB2). • (6.1.6) Opens 8166/8167, Excess Letdown isolation valves (VB2).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 2 **Page** 4 **of** 15

Event Description: **Regen Hx Isolation Valve, LCV-459, Fails to mid-position (continued)**

Time	Position	Applicant's Actions or Behavior
(OP B-1A:IV, "Place Excess Letdown in Service", continued)		
	BOP	• (6.1.7) Monitors RCDT 1-1 level via Aux Watch communication as flush is initiated. • Reads CAUTIONS regarding risk of thermal shock to Excess Letdown Heat Exchanger and the need to operate HCV-123, slowly. • Read NOTES regarding monitoring and adjusting excess letdown once in service. • (6.1.8) Slowly opens HCV-123 to establish excess letdown (VB2). • (6.1.9) Adjusts HCV-123 to provide 40 gpm letdown at normal operating pressure (VB2). • Reads NOTE regarding indications of a leak at the Excess Letdown Heat Exchanger. • (6.1.10) Monitors containment sump level recorders for increased leakage into the sump. • (6.1.11) Places CVCS-1-8143, Excess Letdown Flow Divert Valve, in "NORMAL" when RCDT 1-1 level has risen 13% (VB-2). • (6.1.12) Notes Normal Letdown already isolated. May cross reference **OP B-1A:XII, CVCS - Letdown System Establish Normal Letdown or Change Flow, Section 6.7 - Remove Normal Letdown from Service.**
	ATC/BOP	• (6.1.13-15 HCV-123 and FCV-128 (or HC-459D) are now used to control Pzr Level (to end of scenario).
Proceed to the next event once Excess Letdown established, per the lead examiner.		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 3 **Page** 5 **of** 15

Event Description: **CFCU 1-2 high stator/bearing temperature due to low CCW flow**

Time	Position	Applicant's Actions or Behavior
	ATC	• Observes PK01-21 (Contmt Fan Clr) and informs the Shift Foreman.
(AR PK01-21," Contmt Fan Clr")		
	SRO	Enters AR PK01-21, "Contmt Fan Clr" • (1.0) Identifies input 441 (Contmt Fans Temp PPC) goes to section 2.1, Fan High Temp.
	ATC	• (2.1.1) Checks annunciator and PPC; determines the affected component is CFCU 1-2.
Note: The Crew may elect to secure CFCU 1-2 at any point after discovering the lack of CCW flow and rising CFCU bearing alarms.		
	BOP	• (2.1.2) Checks CCW flow on all CFCUs. Observes CFCU 1-2, FI-35 (VB1, vertical section), is several hundred gpm below normal and trending down. • (2.1.3) Checks containment ambient air temperature less than 120°F. (VB1, vertical section).
	SRO	Reads note regarding CFCU ability to be run at elevated temperatures (stator/bearings), without affecting the component lifetime. • (2.1.4) Notes documentation is required if CFCU is left in service with high temperature alarms.
Note 1: Reactor Operators will be monitoring CFCU 1-2 stator and bearing temperatures using Plant Process Computer (PPC). Actual stator temperature at this point will vary based on crew pace through annunciator response, but is most likely above the limit described below. **Note 2: CFCU 1-2 will trip on overcurrent if fan is still running 7 min after stator temp reaches 380°F.**		
	SRO	• (2.1.5) Notes need to contact engineering for evaluation if fan will be left in service with stator temperature above 293°F. • (2.1.6) Provides direction to shutdown CFCU 1-2 per **OP H-2:II, "Containment Fan Coolers - Shutdown, Placing in Standby, and Clearing"** or **OP H-2:I, "Containment Fan Cooler Units - Make Available and System Operation".** • Enters **TS 3.6.6.C** for one required CFCU system inoperable (7 day shutdown tech spec). ○ CFCU 1-2 inoperable due to no CCW flow and beginning stages of damage to the motor.

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 3 **Page** 6 **of** 15

Event Description: **CFCU 1-2 high stator/bearing temperature due to low CCW flow (continued)**

Time	Position	Applicant's Actions or Behavior
(OP H-2:II, "Containment Fan Coolers - Shutdown, Placing in Standby, and Clearing") if used, else N/A		
	BOP	• Reviews Precautions and Limitations. • (6.1) Stops CFCU 1-2, by pressing associated STOP control on VB1 (center).
	ATC	• Acknowledges reflash on PK01-21 for CFCU 1-2 high vibration (expected during coast down) after verifying input.
	BOP	• Resets CFCU Vibration alarm to clear annunciator panel (VB1, lower).
(OP H-2:I, "Containment Fan Cooler Units - Make Available and System Operation") if used, else N/A		

	BOP	• Reviews Precautions and Limitations.
		• Reads three notes regarding delay time on start and expected alarms.
		• (6.4.1.a) Starts CFCU 1-5 by setting the associated speed select switch to LOW and depressing the switch to start the CFCU VB1 (center).
		• (6.4.1.b) Checks amps stable VB1 (center).
		• (6.4.1.c) Switches CFCU to high speed operation:
		  ○ Presses "STOP" pushbutton for the CFCU 1-5.
		  ○ Immediately places SPEED SELECT switch to "HIGH" AND depresses switch to restart the CFCU.
		  ○ Checks current stabilizes.
		  ○ Returns speed select switch to "LOW".
		• (6.4.1.d) When PK01-21, "Contmt Fan Clrs" alarm comes in for high vibration:
		  ○ Confirms alarm input is for high vibration on CFCU 1-5.
		  ○ Presses VIB ALARM RESET pushbutton to reset the alarm (VB1).
		• (6.4.2) Stops CFCU 1-2, by pressing associated STOP control on VB1 (center).

	ATC	• Acknowledges reflash on PK01-21 for CFCU 1-2 high vibration (expected during coast down) after verifying input.
	BOP	• Resets CFCU Vibration alarm to clear annunciator panel (VB1, lower).
Proceed to the next event once Tech Specs addressed, per Lead Examiner.		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 4 **Page** 7 **of** 15

Event Description: **SSPS relay actuation causes Inadvertent TDAFW Pump Start and Blowdown Sample Line Isolation (CT)**

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnoses TDAFW Pump Start from one or more of the following: • RCS Temperature lowers (secondary cooldown) (CC2, VB2 meters, PPC) • Feedflow / Steamflow rates diverging (CC3, VB3) • RED light on FCV-95 illuminated indicating OPEN w/Tach reading ~ 4500 RPM (VB3) • TDAFW Discharge Pressure ~ 1200 psig, AFW Flow to S/Gs all reading top of scale (VB3) • Diagnoses Blowdown Sample Line Isolation from blowdown valve position indicator lights for FCV-151, 154, 157, 160, 244, 246, 248, and 250 (VB-3)

	ALL	• Reviews primary and secondary side parameters and determines plant is not stable(i.e. in a transient) based on the following indications:
		  ○ RCS Temperature lowers (secondary cooldown) (CC2, VB2 meters, PPC)
		• Reviews secondary side for changed conditions affecting secondary load/efficiency
		  ○ Review of secondary side indications identifies Feedflow / Steamflow mismatch due to excess supply from the TDAFW pump. Numerous pressure, flow, and level gauges confirm the pump is actively feeding forward.

	SRO/BOP	• Foreman implements **TS 3.7.5.B, AFW System for one AFW train inoperable.** Restore to operable status (72 hr)**.** • Directs isolation of the TDAFW Pump. May reference **OP D-1:III, "Auxiliary Feedwater System – Shutdown and Clearing"** or direct isolation by any of the following methods: • **Closing the LCVs -106, 107, 108, and 109 to the individual S/Gs **** **OR** • **Closing steam supply valves FCV-37 and FCV-38 to leads 2 and 3 respectively **** **OR** • **Directing FCV-95 closed in the field **** ****(Critical Task) (S1CT-1) Shutdown TD AFW pump prior to Steam Generator Overfill (S/G wide range greater than 100%)**
Proceed to the next event once Tech Spec addressed, per the lead examiner.		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 5,6,7 **Page** 8 **of** 15

Event Description: **MSLB Outside Containment, downstream of MSIVs; MSIVs Fail Open**

Time	Position	Applicant's Actions or Behavior
	ALL	Crew identifies RCS temperature lowering, pressurizer level and pressure lowering based on the following: Annunciator Response Alarms: • PK09-01, 09-02, 09-03, 09-04 due to lowering S/G pressure and level • PK09-15, DIGITAL FEEDWATER CONT SYSTEM (due to feedflow/steam flow mismatch) • PK05-16, PZR PRESSURE HI/LO (pressure low due to cooldown) • PK04-06, PROTECT CHANNEL ACTIVATED (for Tave less than 554°F on loop 1 due to cooldown) • PK04-14, REACTOR TRIP ACTUATED (if not manually actuated). • PK08-21, SAFETY INJECTION ACTUATION (if not manually actuated w/reactor trip). • RCS Cooldown Indications: PPC, VB2, and CC1 trends • Increased Steam Flow: PPC, VB3, CC3 steam flow meters, record, and trends
	SRO	• May direct manual reactor trip and shutting of MSIVs. • Implements **EOP E-0, "Reactor Trip or Safety Injection".**
	ALL	• Perform immediate actions.
(EOP E-0, "Reactor Trip or Safety Injection")		
	SRO/ATC	• (1) Ensures reactor trip (trip bkrs open, rods on bottom, NIs decreasing) (VB2, CC1). • (2) Ensures turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps).
	SRO/BOP	• (3) Ensures all vital 4kv buses energized (VB4, all vital buses white lights on mimic buses with power supplied by Startup).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 6 **Page** 9 **of** 15

Event Description: **MSLB Outside Containment, downstream of MSIVs; MSIVs Fail Open (continued)(CT)**

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Reactor Trip or Safety Injection", continued)		
	SRO/ATC	• (4) Checks if SI actuated (PK08-21 ON) and reports Train B of SI failed to actuate.
	SRO/BOP	• **Closes MSIVs FCV-41, 43, and 44.**** • Reports FCV-42 will not close. May dispatch field operator to manually isolate FCV-42 following the guidance of EOP E-0 or E-2, Appendix L. ****(Critical Task) (S1CT-2, Stop RCS Cooldown)- Partial**
	SRO/BOP	• (5) Directs App E implemented (usually to BOP)(see page **13**). ○ Board manipulations are as follows: ▪ Manually initiates Main Unit Trip (CC3) ▪ Manually actuates Phase A (VB1) ○ Manually start the following pumps and CFCUs: • CCP 1-2 • ASW 1-2 • SIP 1-2 • RHR 1-1 • CFCUs 1-3, and 1-5 ○ Manually positions the following valves: • 8803B OPEN • LCV-112C CLOSED • 8801B OPEN • 8108 CLOSED • 8805B OPEN ▪ Stops CCP 1-3 ▪ Closes Excess Letdown Isolation Valves 8166 and 8167 (VB2). ▪ Switch LCV-12 to CONT ONLY (VB3). ▪ Main Feedwater Recirc Valves FCV-53 & 54: OPEN (VB3). ▪ Stops all but one CB Pp set. ▪ Turn on Aux bldg vent charcoal filter preheater (VB4). ▪ Throttles RCP seal injection flows to normal if needed (FCV-128, to 8-13 gpm each, CC2).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC Scenario No.: 1 Event No.: 6 Page 10 of 15

Event Description: MSLB Outside Containment, downstream of MSIVs; MSIVs Fail Open (continued)(CT)

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Reactor Trip or Safety Injection", continued)		
	SRO/ATC	• (6) Checks RCS temperature NOT stable ○ **Throttles AFW flow while maintaining minimum of 435 gpm flow**** ○ **Dispatches field operator to close FCV-42 per Appendix L (if not done earlier)**** • (7) Checks Pzr PORVs and Pzr safeties (closed) / PORV block valves (all open and power available), and no elevated tailpipe temps or sonic flows on safeties/PORVs (VB2 – upper panel, far right); checks Pzr sprays closed (CC2). • (8) Checks RCP trip criteria (RCS pressure [VB2, PPC] < 1300 psig and SI or ECCS CCPs running; determines RCPs should be secured (VB2). • (9) Checks for faulted S/Gs ○ Notes MSIV FCV-42 could NOT be closed from the control room. ○ S/G pressure continuing to lower on S/G 1-2 (VB3). ****(Critical Task) (S1CT-2, Stop RCS Cooldown)- Partial**
	SRO	• Transitions to EOP E-2 (next page).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC Scenario No.: 1 Event No.: 6 Page 11 of 15

Event Description: MSLB Outside Containment, downstream of MSIVs; MSIVs Fail Open (continued)(CT)

Time	Position	Applicant's Actions or Behavior
(EOP E-2, "Faulted S/G Isolation")		
	SRO	Reads three CAUTIONS prior to step 1.

	SRO/ATC	• (1) Checks if MSIV FCV-42 is still open.
		  ○ **Dispatches field operator to close FCV-42 per Appendix L (if not done earlier)****
		  ○ Notes bypasses are closed (VB3, upper panel, left side).
		• (2) Checks for any intact S/G – notes S/G 1-1, 1-3, and 1-4 are intact.
		****(Critical Task) (S1CT-2, Stop RCS Cooldown)- Partial**

	SRO/ATC	• (3) Identifies 1-2 S/G as faulted (VB3, pressure is still dropping in uncontrolled manner, or completely depressurized at this point).
	SRO	Reads caution regarding steam supply for TDAFW; determines it does not apply. • (4) Directs Reactor Operator to Implement Appendix HH to isolate the Faulted S/G (see page **15**).

	SRO/ATC	• (5) Checks CST level > 10% (VB3, upper panel, center area meter and recorders).
		• (6) Checks S/Gs not ruptured:
		  ○ (6.a) Notes NO valid alarm on PK11-06, PK11-17, or PK11-18.
		  ○ (6.b) No upward trends on RE-19/15/15R/71-74.
		  ○ (6.c) Directs Chemistry to sample S/Gs per CAP AP-1.
		• (7) Checks if ECCS flow should be reduced:
		  ○ (7.a) RCS Subcooling GREATER THAN 20°F (SCMM or Appendix C).
		  ○ (7.b) Secondary heat sink satisfied by either 435 gpm AFW flow or NR level in at least one S/G greater than 15%.
		  ○ (7.c) RCS Pressure - STABLE OR RISING.
		  ○ (7.d) PZR Level - GREATER THAN 12%.
		  ○ (7.e) Transitions to EOP E-1.1, "SI TERMINATION".

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 6 **Page** 12 **of** 15

Event Description: **SI Termination (CT)**

Time	Position	Applicant's Actions or Behavior
(EOP E-1.1, "Terminate SI")		
	SRO/ATC	• (1) Checks SI Reset (VB1). • (2) Aligns Charging: ○ (a) Checks ECCS CCPs running (VB2).
	SRO/BOP	• (2) Aligns Charging: ○ (b) Resets vital 4kV auto transfer relays for all vital buses (VB4).

	SRO/ATC	• (2) Aligns Charging:
		  ○ (c) Stops one ECCS CCP (VB2).
		  ○ (d) Notes CCP 1-3 already shutdown (VB2).
		• (3) Checks RCS Pressure STABLE or RISING (VB2 or PPC).
		• (4) Isolates charging injection
		  (a) Closes 8803A/B (VB1)(S1CT-3)**
		  (b) Closes 8801A/B (VB1)(S1CT-3)**
		
		****(Critical Task) (S1CT-3) Terminate SI prior to rupture of PRT by closing 8801A/B or 8803A/B.**
		(Note: CT is met by closing either 8801A/B OR 8803A/B.)

The scenario is terminated once Critical Task S1CT-3, Terminate SI, is complete per Lead Examiner		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 6 **Page** 13 **of** 15

Event Description: **MSLB Outside Containment, downstream of MSIVs; MSIVs Fail Open (continued)**

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Appendix E - ESF Auto Actions, Secondary and Auxiliaries Status")		
	BOP	Implements "App E (ESF Auto Actions, Secondary and Auxiliaries Status)": • (1) Notifies Plant Personnel. o Checks no personnel in Containment (part of turnover; may not voice); Announces trip/SI on PA system. • (2) Checks main generator – tripped. o PK14-01 OFF, output breakers OPEN, Exciter Field Breaker - OPEN (CC3 right side) o Manually initiates Main Unit Trip (CC3). • (3 & 4) Ensures Phase A and Containment Vent Isolation complete (VB1, ESF status lights, red lights- Trn A ON, Trn B OFF, various white lights ON). o Manually actuates Phase A (VB1). • (5) Ensures ESF (SI) actuation complete (VB1, ESF status lights, red light ON, various white lights ON). o Manually start the following pumps and CFCUs: • CCP 1-2 • ASW 1-2 • SIP 1-2 • RHR 1-1 • CFCUs 1-3, and 1-5 o Manually positions the following valves: • 8803B OPEN • LCV-112C CLOSED • 8801B OPEN • 8108 CLOSED • 8805B OPEN • (6) Verifies Feedwater isolation complete (F.W. Isolation and S.G. Level Portions of Monitor Light Box C: red lights ON, white lights OFF (VB1).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 6 **Page** 14 **of** 15

Event Description: **MSLB Outside Containment, downstream of MSIVs; MSIVs Fail Open (continued)**

Time	Position	Applicant's Actions or Behavior
(EOP E-0, Appendix E - ESF Auto Actions, Secondary and Auxiliaries Status)		
	BOP	• (7) Determines Containment Spray and Phase B Isolation is NOT required (Contmt Isol, Phase B portion of Monitor Light Box D: red lights are OFF (VB1)). • (8) Checks Main Steamline Isolation complete (Main Steam Isolation portion of Monitor Light Box D: red light ON, white light ON for FCV-42 (VB1)). o Dispatches field operator to close FCV-42 per Appendix L if not previously directed. • (9) Checks AFW status o Both MDAFW pumps running with flow throttled to maintain greater than 435 gpm min flow (VB3). • (10) Checks ECCS flows (charging injection (VB2), SI, RHR (VB1) o Shuts down CCP 1-3 (VB2). • (11) Reports ESF and AFW status to the Shift Foreman (Shift Foreman may direct operator to continue on in Appendix E, or redirect to higher priority tasks). • (12) Isolates excess letdown – 8166 and 8167 (VB2). • (13) Checks secondary systems MFPs tripped (VB3, green lights ON), stops all but one CB Pp set, takes LCV-12 control switch to CONT ONLY, takes FCV-53 and FCV-54 to RECIRC. • (14) Verifies proper operation of Aux Bldg and Control Rm vent systems (VB4 vent status light panel white lights); turns on aux bldg vent charcoal filter preheater (VB4 lower panel, left side) and verifies containment iodine fans secured (VB4, lower panel). • (15) Verifies available DGs running normally (VB4). • (16) Verifies vital batteries indicate normal voltage and positive charging amps VB5). • (17) Verifies MSRs reset (Triconex HMI)(CC3). • (18) Throttles RCP seal injection flows if needed (FCV-128, to 8-13 gpm each, CC2). • (19) Checks PK11-04 NOT IN (SFP alarm). • (20) Notifies Shift Foreman of completion.
(Board Operator will rejoin crew upon completion of Appendix or when called upon by Shift Foreman)		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 1 **Event No.:** 5,6 **Page** 15 **of** 15

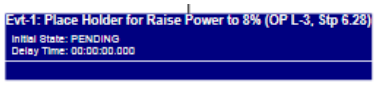
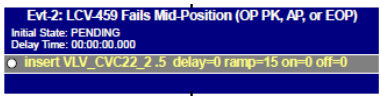
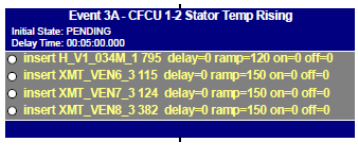
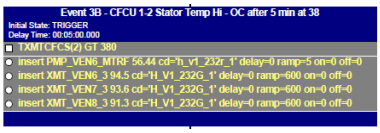
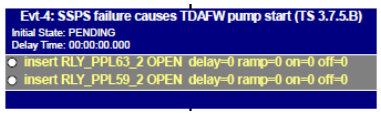
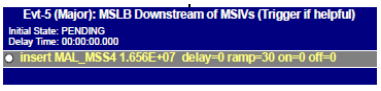
Event Description: **EOP E-2, "Appendix HH, Isolate Faulted Steam Generator" (CT)**

Time	Position	Applicant's Actions or Behavior
EOP E-2, "APP HH, Isolate Faulted S/G"		
	BOP	• (1) Isolates faulted S/G 1-2: ○ (1.a) Ensures MFIVs FCV-439 closed. ○ (1.b) Ensures SGBD valves FCV-761, 154, and 248 (IC, OC, and sample). ○ (1.c) Ensures (PCV-20) 10% steam dump closed. ○ (1.d) Ensures AFW control valves isolated ○ **Ensures closed TDAFW AFW LCV-107** (unless closed earlier)** ○ **Closes MDAFW AFW LCV-111.**** ○ (1.e) Ensures Steam Supply Valves from S/G 1-2 is isolated. ○ **Ensures closed FCV-37** (unless closed earlier)** (1.f) Ensures AFW flow still available to S/Gs 1-1, 1-3, & 1-4. ○ (1.g) Informs Shift Foreman S/G isolation complete for S/G 1-2. ****(Critical Task) (S2CT-2, Stop RCS Cooldown)- Partial**
	BOP	(2) Removes WR T_{hot} input to SCMM for loop2 (behind boards, PAMS panel behind VB3). ○ Goes to PAM4 panel. ○ Presses "Configuration Summary", Presses "Failed S/G". ○ Presses the PB for the Thot to be disabled (2), Presses "Disable Loop 2".

** Critical Task

Attachment 1 – Scenario Set-up & Booth Actions

X = manual entry required

	TIME LINE	CONSOLE ENTRY	SYMPTOMS/CUES/DESCRIPTION
X	IC	RESTORE IC-47	2%; MOL, C_B – See Turnover Sheet
X	Setup	N/A	CFCU 1-1 OOS; CFCU 1-2, 1-3, 1-4 running in HIGH; CFCU 1-5 is OFF.
	The Plant Abnormal Status Board for Surveillance Requirements		NONE
	Copies of Procedures, Attachments; Appendixes; Foldout Pages; Annunciator Response Procedures and commonly used forms are in binders and **NOT** Marked up		***OP B-1A:IV, D-1:III, H-2:II, PK01-21, AP-18, EOP E-0, E-2, E-1.1***
X	0 min	Tools > Simple SBT	Before crew takes the watch. Use Simple SBT, Data Recorder File: sbt_sim.drb, min 960 iterations (30 sec). <u>Critical Task Specific Data Capture:</u> • S1CT1: TDAFW flow and S/G levels • S1CT2: FCV-42 position, AFW flow • S1CT3: ECCS Injection Flow
X	0 min	Lesson L181 NRC-S1.lsn	After SFM reports the crew has taken the watch, load session MALS, OVRs, etc. by FILE or MANUALLY (below)
X	<u>Evt-1: Raise Power</u> (approx. 3 min after taking watch per lead examiner)		Placeholder only
X	<u>Evt-2: LCV-459, Fails to mid-position</u> (Once power raised 0.5%, per lead examiner)		LCV-459, Fails to mid-position
X	<u>Evt-3: CFCU 1-2 High Stator Temp</u> (once Excess Ltdn established, per Lead Examiner)	 	Stator and bearing temperatures ramp up over 2-3 minutes. CFCU will trip on overcurrent if it has not been shut down within 7 minutes of reaching 380°F. If crew does not request removing CFCU 1-2 from service, enter command to have CFCU 1-2 trip on OC when it restarts due to SI signal.
X	<u>Evt-4: Inadvertent start of TDAFW pump</u> (Once Evt-2 TS have been addressed, per lead examiner)		Inadvertent start of TDAFW pump and partial blowdown isolation
X	<u>Evt-5: MSLB on S/G 1-2</u> (Once Evt-4 TS have been addressed, per lead examiner)		MSLB downstream of MSIVs.

(con't on next page)

Attachment 1 – Scenario Set-up & Booth Actions (con't)

X = manual entry required A = activate from EVENT file

TIME LINE	CONSOLE ENTRY	SYMPTOMS/CUES/DESCRIPTION
Evt-6: MSIVs Fail Open (post trip))	**Evt-6: MSIVs Fail Open; No manual close for FCV-4x** Initial State: TRIGGER Delay Time: 00:00:00.000 insert VLV_MSS7_1 1 delay=0 ramp=0 on=0 off=0 insert VLV_MSS8_1 1 delay=0 ramp=0 on=0 off=0 insert VLV_MSS9_1 1 delay=0 ramp=0 on=0 off=0 insert VLV_MSS10_1 1 delay=0 ramp=0 on=0 off=0 delIA VLV_MSS7_1 2 delay=0 cd='v3_183s_1' delIA VLV_MSS9_1 2 delay=0 cd='V3_185S_1' delIA VLV_MSS10_1 2 delay=0 cd='V3_186S_1'	All four MSIVs fail open. FCV-41, 43, and 44 can be closed in the control room. Crew will need to call to have FCV-42 closed. **DO NOT CLOSE FCV-42 UNTIL CREW HAS ENTERED E-2.**
Evt-7: SI, Train B fails to actuate (post trip)	**Evt-7: Safety Injection Train B Fails** Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_PPL3B BOTH delay=0 ramp=0 on=0 off=0	Crew will manually initiate Safety Injection in response to MSLB. Failure will require manual starting of Train B ECCS pumps and manual alignment of valves.

Diablo Canyon Power Plant
Operations Shift Log

Unit 1

Unit 1 Days at Power: 0 Days

Operating Mode: 2 ***Gross Generation: 0 MWe***

Power Level: 2% ***Net Generation: 0 MWe***

Today – Dayshift

Shift Manager Turnover:

PRA RISK STATUS NEXT SHIFT:	Green
GRID STATUS NEXT SHIFT:	Normal
AVERAGE RCS CALCULATED LEAKRATE:	0.01 gpm
CONDENSER INLEAKAGE:	< 0.01 gpd
CONDENSER D/Ps:	NW 5.7 SW 5.7 NE 5.7 SE 5.8 PSID
MAIN GENERATOR H2 USAGE:	325 scfd / 327 scfd 5 day ave
SPENT FUEL POOL:	Temp = 80°F; Time to 200°F = 30 hrs using actual temp (F-ID-7A)

NEW EMERGENT WORK:
- CFCU 1-1 OOS for Bearing Replacement

SHUTDOWN TECH SPECS / ECGS:
- None

ECG ACTIONS THAT IF COMPLETION TIME NOT MET ECG 0.3 IS ENTERED:
- None

TURNOVER ITEMS:
- Reactor trip occurred 7 days ago.
- The reactor was declared critical and power stabilized at 2% power late last shift.
- MFP 1-1 is in service and supplying feedwater.
- The unit is currently aligned to Startup Power (230 kV).
- OP L-0 has been signed off for Mode 1 Entry.
- No one is in Containment.
- CFCU 1-1 OOS for Bearing Replacement.

PRIORITY ITEMS FOR NEXT SHIFT:
- Continue with OP L-3, step 6.28, and stabilize power at approximately 8%.

ANNUNCIATORS IN ALARM:
- There are no unexpected alarms - all current alarms are consistent with current mode and power level.

Shift Foreman Turnover

TURNOVER ITEMS:

- U-1: 2% and preparing to raise power to approximately 8%.
- U-2: maintain 100%.

REACTIVITY MANAGEMENT:

- Time in core life: _MOL_.
- Power History: Previously at 100% for 17 days. Currently power level is approximately 2% following a reactor trip a week ago (MFP trip during maintenance).
- Boron concentration is _1259 ppm_ from a sample taken 2 hours ago.
- Control Rod Height: 158 steps on CBD.
- Rod motion: used to maintain current power level and to raise power to 8%.

CONDITIONAL SURVEILLANCES & INCREASED MONITORING:

- None

OTHER ABNORMAL PLANT STATUS

- None

Facility: Diablo Canyon (PWR) **Scenario No:** 2 **Op-Test No:** L181 NRC

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: **75% Power, MOL with AFW 1-2 cleared for a bearing oil leak**

Turnover: **At 75% power for SCCW HX Clearance**

Event No	Malf No.	Event Type*	Event Description (See Summary for Narrative Detail)
1	PZ04PRZ_PRH11_.. RCARRL_IPC455JXTVSP 0	**I (ATC, SRO)**	Pressurizer heater control problem causes RCS pressure to slowly lower (**AR PK05-16, OP AP-13**).
2	XMT_PZR24_3 ramp=1	**TS, I (BOP, SRO)**	PT-474, Pressurizer Pressure Transmitter, Fails Low (**OP AP-5**, **TS 3.3.1.E, M, 3.3.2.D, 3.4.11,.B**).
3	XMT_CVC2_3 ramp=75	**I(BOP, SRO)**	PT-135 Fails High causing letdown pressure control valve to go full open (**AR PK04-21**).
4	MAL_RCS4H 30.0	**TS, C (ALL)**	30 gpm SGTL on loop 4; plant shutdown required (**OP AP-3, AP-25, TS 3.4.13.B**).
5	MAL_RCS4H 300.0 ramp=60	**M (ALL)**	Tube leak grows to 300 gpm rupture during ramp offline.
6	RC41SW_52VE3_CSTA_SWIT 1 cd='H_V5_195B_1'...	**C (BOP, SRO)**	RCPs trip off shortly after transferring to startup power.
7	MAL_EPS4D_2 DIFFERENTIAL cd='h_v4_221r_1'	**C (ALL)**	4kV Bus G differential trip on transfer to startup power.
8	VLV_PZR5_1 1 cd='H_V2_014M_1 LT 1915' delay=8 VLV_CVC17_1 1 VLV_CVC27_1 1	**C (ALL)**	PORV PCV-456 fails closed. Aux spray valves 8145 and 8148 fail closed.

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
1. Total malfunctions (5–8) (Events 1,2,3,4,5,6,7,8)	8
2. Malfunctions after EOP entry (1-2) (Events 6,7,8)	3
3. Abnormal events (1–4) (Events 1,2,3,4)	4
4. Major transients (1-2) (Event 5)	1
5. EOPs entered/requiring substantive actions (1–2) (E-3, ECA-3.3)	2
6. EOP contingencies requiring substantive actions (0–2) (ECA-3.3)	1
7. Critical tasks (2–3)(See description below)	3

Critical Task	Justification	Reference
(S2CT-1) Isolate the ruptured steam generator from the intact steam generators prior to commencing cooldown of the RCS in step 9.c (40% steam dumps) or 10.b (10% steam dump) by completing the following: Isolate feedwater by ensuring closed: LCV-109 (TDAFW Level Control Valve) LCV-113 (MDAFW Level Control Valve)	SG inventory increase leads to water release through the S/G PORV or safety valve(s) or to SG overfill, which would seriously compromise the SG as a fission-product barrier and complicate mitigation.	• W Margin to Overfill (CN-CRA-05-53 Rev1) • W Offsite Doses (CN-CRA-05-54) • SGTR UFSAR 15.4.3 • WCAP-17711-NP
(S2CT-2) Perform RCS cooldown at maximum rate to CETC target temperature specified in E-3, step 6, using steam dumps such that RCS subcooled margin still exists following the cooldown. *For 40% steam dumps, maximum rate limit is 120 psi/min (PPC value). Above this, main steam line isolation will occur. Operator should attempt highest rate possible without getting main steam line isolation (not critical). If steam line isolation occurs, maximum rate cooldown requires 10% steam dumps on intact S/Gs to be at least 90% open.*	Transition to contingency procedures to address inadequate subcooling or Pressurized Thermal Shock conditions results in delaying RCS depressurization and SI termination. This delay allows excess inventory in the ruptured S/G to continue to increase, with the potential of challenging SG overpressure components or causing an overfill condition to occur.	• W Margin to Overfill (CN-CRA-05-53 Rev1) • SGTR UFSAR 15.4.3 • WCAP-17711-NP
(S2CT-3) Restore RCS pressure control by restarting RCP 1-2 and returning from EOP contingency procedure (ECA-3.3) to normal EOP flow path (E-3)	Failure to establish RCS pressure control results in safety injection termination occurring at a significantly higher RCS pressure. Avoidable primary to secondary leakage into a ruptured steam generator complicates results in the unnecessary continuation of a degraded condition beyond that irreparably introduced by the scenario.	• W Margin to Overfill (CN-CRA-05-53 Rev1) • SGTR UFSAR 15.4.3 • WCAP-17711-NP
Per NUREG-1021, Appendix D, if an operator or crew significantly deviates from or fails to follow procedures that affect the maintenance of basic safety functions, those actions may form the basis of a CT identified in the post-scenario review.		

SCENARIO SUMMARY – NRC #2

1. The firing rate for Pressurizer Proportional Heaters fail to minimum and RCS pressure begins to lower slowly. Backup heater relay pc455jx fails to actuate when RCS pressure reaches 2210 psig which also results in a failure of annunciator **AR PK05-16, PZR PRESSURE HI/LO** activation. Pressurizer pressure control HC-455K output signal indicates that backup heaters should be on and proportional heaters should be operating at the maximum firing rate. When RCS pressure reaches 2185 psig, **AR PK05-16, PZR PRESSURE HI/LO** alarms based on Pressurizer pressure going below the PORV interlock setpoint. The crew follows AR PK05-16 guidance to manually turn on all backup pressurizer heaters and follow up with the actions of **OP AP-13, Malfunction of Reactor Pressure Control System**, to restore pressure to normal using manual control. The crew may diagnose the failure prior to the annunciator response activating and enter OP AP-13 directly which also directs turning on all backup heaters. If RCS pressure falls below 2175 psig, the Shift Foreman will enter **Tech Spec 3.4.1 for RCS departure from nucleate boiling limits** (2 hr).

2. PT-474, Pressurizer Pressure Transmitter, Fails low bringing in multiple Annunciator Alarms. There is no transient associated with this failure, but the failure has significant Operational implications due to its input function as part of various Reactor Protection logic schemes. When failed low, PT-474's interlock function prevents Pressurizer PORVs PCV-455C and PCV-474 from opening on a valid high pressure signal; only PCV-456 will still function. The Shift Foreman may elect to enter any of the associated Annunciator Response alarms, but in all cases, will be directed to **OP AP-5, Malfunction of Eagle-21 Protection or Control Channel**, which provides information regarding indications, controls, and a listing of the associated Tech Specs:

   - **TS 3.3.1.E, PC-474C High Press Trip & TC 441C OT Delta T Trip** (72 hrs).
   - **TS 3.3.1.M, PC 474A Low Press Trip** (72 hrs).
   - **TS 3.3.2.D, PC 474D Low Press S.I.** (72 hrs).
   - **TS 3.4.11, PC 474B PORV Press Interlock**
     - **PCV-474 (non-class I), 3.4.11.B1 & B2 to close & remove power from associated block valve** (1 hr)
     - **PCV-455C (class I), 3.4.11.B1 & B2 to close & remove power from associated block valve** (1 hr); **3.4.11.B3 to return to OPERABLE status** (72 hrs).

3. PT-135, Transmitter for Letdown Pressure Control Valve**,** fails High causing letdown pressure control valve to go full open and letdown flow to rise. **AR PK04-21, LETDOWN PRESS / FLOW TEMP** comes into alarm for Letdown Heat Exchanger Outlet Pressure High as a result of the failed transmitter, while actual letdown pressure lowers to approximately 90 psig as a result of full open control valve response. Letdown flow increases approximately 8 gpm above normal, resulting in a charging/letdown mismatch. Procedural guidance in AR PK04-21 directs crew to take manual control of PCV-135. Crew performs diagnostic brief to determine nature of the malfunction as well as actions required to restore letdown pressure back to normal band.

4. Steam Generator 1-4 develops a 30 gpm tube leak as indicated by rising counts on various radiation monitors. The crew enters **OP AP-3, Steam Generator Tube Failure**. Shift Foreman determines **TS 3.4.13.B, RCS Operational Leakage** applies and enters **OP AP-25, Rapid Load Reduction or Shutdow** for the ramp off-line.

5. During the ramp the tube leak develops into a 300 gpm rupture. The crew determines the leak is substantial in size based on a rapid drop in pressurizer level. The Shift Foreman directs a reactor trip and safety injection and the crew enters **EOP E-0, Reactor Trip or Safety Injection.**

6. On the transfer to start up power, 4 kV bus G experiences a differential fault. The crew also notes all four RCPs trip off on the transfer, but power to the pumps remains available.

7. The crew transitions to **EOP E-3, Steam Generator Tube Rupture,** based on RM-74 and rising S/G 1-4 level, where they address the following critical tasks:

   - **(S2CT-1) Isolate the ruptured steam generator from the intact steam generators prior to commencing cooldown.**
   - **(S2CT-2) Perform RCS cooldown at maximum rate to CETC target temperature.**

8. The crew discovers they are unable to depressurize the RCS based on a combination of equipment failures:

   - With no running RCPs, normal pressurizer spray is ineffective.
   - PCV-456 has failed closed and will not opened.
   - Block valve 8000B, associated with PCV-455C was closed during an earlier event and cannot be opened due loss of bus G.
   - Block valve 8000A, associated with PCV-474 was also closed during the earlier event and will not open.
   - Aux Spray valves 8145 and 8148 are failed closed as well.

9. The crew transitions to **EOP ECA-3.3, SGTR Without Pressurizer Pressure Control**, where they complete critical task **(S2CT-3) Restore RCS pressure control by restarting RCP 1-2.** Following procedural guidance, the crew determines normal spray is available and returns to **EOP E-3, Steam Generator Tube Rupture.**

The scenario is terminated once the crew has started RCP 1-2 and transitioned back into E-3.

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 1 **Page** 1 **of** 21

Event Description: **Pressurizer Spray PCV-455A setpoint fails low**

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnoses spray problem from: • RCS Pressure lowering (VB2, PPC). • PK05-16 actuation when RCS pressure reaches 2210 psig. • Spray valve indicating open (CC2).
(AR PK05-16, "PZR PRESSURE HI/LO") if entered, else N/A		
	SRO	• (2.1.1) Advises crew that entry into EOP E-0 is required in the event of a reactor trip.
Note: Crew may refer to AR PK05-16 prior to annunciator actuating at 2210 psig, in which case the following step would not apply.		
	SRO/BOP	• (2.1.2) Notes RCS pressure is less than 2210 psig. o Checks PORVs closed (VB2). o Checks both spray valves closed ▪ Notes Pressurizer Spray Valve, PCV-455A is NOT closed (CC2). ▪ Takes manual control and closes PCV-455A.
Note: Turning on pressurizer backup heaters will allow crew to restore RCS pressure to the normal bank. Manual control, however, will be required for the duration of the scenario.		
	SRO/ATC	• (2.1.2) Notes RCS pressure is less than 2210 psig. o Turns on PZR backup heaters (CC1).
	SRO	• (2.1.3) Checks if RCS pressure is less than 2175 psig. o If yes, references TS 3.4.1 for RCS departure from nucleate boiling limits.
	SRO/ATC	• (2.1.4) Verifies HC-455K, Pzr Pressure Controller, set at 78.8% Setpoint (2235 psig).
	SRO/BOP	• (2.1.5) Performs a channel check of all Pzr pressure channels (VB2).

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 1 **Page** 2 **of** 21

Event Description: **Pressurizer Spray PCV-455A setpoint fails low (continued)**

Time	Position	Applicant's Actions or Behavior
	SRO/ATC	• Reads note regarding PCS automatic control channel selection. • (2.1.6) Checks pressurizer pressure channel readings for channel check.
	SRO	o Goes to OP AP-5, "Malfunction of Eagle 21 Protection or Control Channel."
(OP AP-5, "Malfunction of Eagle-21 Protection or Control Channel") if used, else N/A		
	SRO/ATC	• (1) Determines primary and secondary control systems are NOT controlling properly in AUTO. o Takes manual control of PCV-455A and closes (if not done previously).
	SRO/BOP	• (2) Determines that the failure is not Eagle-21 related (PK06-01 and PK06-03 are OFF).
	SRO/ATC	• (3) Determines failure is associated with Pressurizer Pressure, but failure does not affect the currently selected ΔT channel (VB2).
	SRO/BOP	• (4) Verifies steam dumps are not open.
	SRO	• (5) Notifies I&C of apparent pressurizer spray control failure. • Reads CAUTION regarding Eagle 21 design failure impact to outputs prior to step 6. • (6) Notes requirements to take channel OOS prior to maintenance.
	SRO/ATC	• (7-8) Determines remaining steps of procedure do not apply and exits OP AP-5.

(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 1 **Page** 3 **of** 21

Event Description: **Pressurizer Spray PCV-455A setpoint fails low (continued)**

Time	Position	Applicant's Actions or Behavior
(OP AP-13, "Malfunction of Reactor Pressure Control System") if entered, else N/A		
	SRO	• (1) Notes there are no load changes in progress.
	SRO/BOP	• (2) Checks PZR PORVs – CLOSED (VB2). • (3) Checks PZR Safety Relief Valves (VB2): o (3.a) Sonic flow indicators – approx. ZERO. o (3.b) Tail pipe temp – LESS THAN 185°F.
	SRO	• Reads Caution regarding RCPs and normal spray supply.
	SRO/ATC	• (4.a) Checks normal PRZ spray valves – CLOSED (CC2): o PCV-455A o PCV-455B ▪ Notes 455A is NOT closed. ▪ Takes manual control and closes valve.
	SRO/BOP	• (4.b) Checks auxiliary PRZ spray valves – CLOSED (VB2): o 8145 and 8148
	SRO/ATC	• (5) Checks Pressurizer Heaters (CC1): o (5.a) Notes normal power is available. o (5.b) Notes PZR pressure is LESS THAN 2250 psig. o (5.c RNO) If PZR pressure is NOT GREATER THAN 2210 psig; turns on all available backup PZR heaters.
	SRO/BOP	• (6) Checks all pressure control channels operable (VB2, PCS).
	SRO/ATC	• (7.a) Restores RCS Pressure to normal band (2210-2260 psig) using manual control.
Proceed to the next event once Pressurizer Pressure under control, per Lead Examiner)		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 2 **Page** 4 **of** 21

Event Description: **PT-474, Pressurizer Pressure Transmitter, Fails Low**

Time	Position	Applicant's Actions or Behavior
(AR PK04-06, "PROTECT CHANNEL ACTIVATED") if entered, else mark N/A		
	SRO	• (1.0) Goes to section 2.1, General Actions. • (2.1.1,2) Notes Annunciator Response contains reactor trip criteria and advises Crew. • (2.1.3) Notes there are no surveillance tests in progress to cause the alarm.

	SRO/ATC	• (2.1.4) Checks PPC for ALL protection channel bistables "OFF".
		• (2.1.5) Identifies failed channel.
		  ○ Refers to TS 3.3.1, "Reactor Trip System (RTS) Instrumentation".
		  ○ Goes to OP AP-5, "Malfunction of Protection or Control Channel" (**see pg 5**)

(AR PK05-16, "PZR PRESSURE HI/LO") If entered, else mark N/A		
	SRO	• (1.0) Goes to section 2.1, General Actions. • (2.1.1) Notes Annunciator Response contains reactor trip criteria and advises Crew.
	SRO/ATC	• (2.1.2,3) Notes actual pressurizer pressure is less NOT less than 2210 psig (PORV/spray actuation) or 2175 psig (RCS departure from nucleate boiling limits). • (2.1.4) Verifies HC-455K, Pzr Pressure Controller, set at 78.8% Setpoint (2235 psig).
	SRO/BOP	• (2.1.5) Performs a channel check of all Pzr pressure channels; identifies PI-474 reading bottom of scale (VB2). • Reads NOTE regarding PCS Control Set input selection scheme (Median Select, based on 2nd highest out of channels) and possible failure scheme (3 of 4 inputs detected bad). • (2.1.6) Checks for Pressurizer pressure channel abnormal reading. Identifies PI-474 reading bottom of scale (VB2). ○ Check HC-455K in AUTO and controlling Pzr pressure with P_{ACT} and P_{REF} nearly matched (CC2). • Goes to OP AP-5, "Malfunction of Protection or Control Channel" (**see next page**)
		(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC Scenario No.: 2 Event No.: 2 Page 5 of 21

Event Description: PT-474, Pressurizer Pressure Transmitter, Fails Low (continued)

Time	Position	Applicant's Actions or Behavior
(AR PK06-21, "PROCESS CONTROL SYS TROUBLE") If entered, else mark N/A		
	SRO	• (1.0) Goes to Section 2.1, PCS Rack Channel Trouble.

	SRO/BOP	• (2.1.1) Checks PCS HMI on CC4 to determine alarming channel.
		• (2.1.2) May check PY-17N (behind hot shutdown panel) for no breakers tripped.
		• (2.1.3) REFERs to Attachment for individual alarm input.
		  ○ Identifies **mPzrPres_Dev, PT-455/PT-456/PT-457/PT-474 Pzr Press Channel Deviation** (NON SAFETY RELATED CONTROL SET 1)
		  ○ Notes input has no associated automatic or Operator actions.

(OP AP-5, "Malfunction of Eagle-21 Protection or Control Channel")		
	SRO/ATC	• (1) Determines primary and secondary control systems are controlling properly in AUTO.
	SRO/BOP	• (2) Determines that the failure is not Eagle-21 related (PK06-01 and PK06-03 are OFF).
	SRO/ATC	• (3) Determines failure is not associated with the selected ΔT channel (VB2).
	SRO/BOP	• (4) Verifies steam dumps are not open as result of instrument failure or spurious actuation.
	SRO	• (5) Notifies I&C of apparent pressurizer controller failure. • Reads CAUTION regarding Eagle 21 design failure impact to outputs prior to step 6. • (6) Notes requirements to take channel OOS prior to maintenance.

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** Critical Task

Op-Test No.: L181-NRC Scenario No.: 2 Event No.: 2 Page 6 of 21

Event Description: PT-474, Pressurizer Pressure Transmitter, Fails Low (continued)

Time	Position	Applicant's Actions or Behavior
(OP AP-5, "Malfunction of Eagle-21 Protection or Control Channel", continued)		
	SRO/ATC	• (7) Uses Attachments 5.1 and 5.2 to determine affected indicator ○ (a) Places Out-of–Service (OOS) sticker on the following: ▪ PI 474, Pressurizer Pressure Indicator (VB2). ▪ PR 455, Pressurizer Pressure Recorder (CC2) from PCS.
	SRO/BOP	• Reads NOTE regarding inoperable PZR PORV(s) requiring TS actions to be completed within 1 hour of inoperability. • (8) Uses Attachment 5.1, pg 16, and Attachment 5.2, pg 7, to determine required TS/ECG actions for the inoperable channel: ○ **TS 3.3.1.E**, PC-474C High Press Trip & (TC 441C OT Delta T Trip) (Place channel in trip within 72 hrs). ○ **TS 3.3.1.M**, PC 474A Low Press Trip (Place channel in trip within 72 hrs). ○ **TS 3.3.2.D**, PC 474D Low Press S.I. (Place channel in trip within 72 hrs). ○ PC 474B PORV Press Interlock: ▪ PCV-455C & PCV-474: **TS 3.4.11.B.1 & B.2** (Close associated block valves and remove power within 1 hr). ▪ PCV-455C: also requires **TS 3.4.11.B.3** (Since this is a Class I PORV, must restore to operable status within 72 hours). ○ Identifies affected controls: ▪ PCS (PM 474A) Pzr Press Control. ▪ PORV 455C & 474 Low Press Interlock.
	SRO	• Directs board operator to implement OP A-4A:III, "Pressurizer – Shutdown and Clearing" to close and remove power from block valves associated with PCV-455C (Section 6.4) and 474 (Section 6.6).
		(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 2 **Page** 7 **of** 21

Event Description: **PT-474, Pressurizer Pressure Transmitter, Fails Low (continued)**

Time	Position	Applicant's Actions or Behavior
(OP A-4A:III, "Pressurizer – Shutdown and Clearing")		
	BOP	Section 6.4 – "RCS-1-PCV-455C – Removing from Service at Power", step 6.4 • (6.4.3) Places PCV-455C control switch to CLOSE (VB2) • (6.4.4.a) Closes 8000B, Block Valve B. • (6.4.4.b) Contacts field operator to open associated breaker 52-1G-46.
	BOP	Section 6.6 – "RCS-1-PCV-474 – Removing from Service at Power", step 6.6. • (6.6.3) Places PCV-474 control switch to CLOSE (VB2) • (6.6.4.a) Closes 8000A, Block Valve A. • (6.6.4.b) Contacts field operator to open associated breaker 52-1F-40.
Proceed to the next event once Tech Specs are addressed, per Lead Examiner		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 3 **Page** 8 **of** 21

Event Description: **PT-135, Transmitter for Letdown Pressure Control Valve, Fails High**

Time	Position	Applicant's Actions or Behavior
	ATC	• Observes PK04-21 (Letdown Press/Flo Temp) and informs the Shift Foreman.
(AR PK04-21, "LETDOWN PRESS / FLO TEMP")		
	SRO	• Enters AR PK04-21, "LETDOWN PRESS / FLO TEMP" ○ (1.0) Identifies input 393 (Letdn HX Outlet Press Hi) and goes to section 2.1, General Actions. ○ Reads two CAUTIONS (potential reactivity impact of letdown temperature excursions and elevated dose rate concerns if argon injection continues with letdown isolated. ○ (2.1.1) Notes if letdown is isolated, argon injection must be isolated as well. ○ (2.1.2) Notes requirement to go to seals only charging if letdown gets isolated.
Note: Crew may call for diagnostic brief during annunciator response implementation		
	ALL	• (2.1.3) Checks for indications of a letdown line break: ○ Letdown flow decrease – NO, flow has risen approximately 8 gpm. ○ Letdown pressure decrease – PI-135 reads high while letdown flow rise indicates pressure has fallen. ○ Containment sump level increasing – NO, sumps remain stable. ○ VCT level decreasing – NO, VCT level begins to rise very slowly. • Determines indications are not consistent with a letdown leak.
	SRO/BOP	• (2.1.4) Checks if letdown HX outlet pressure is high. ○ Notes PI-135 reads high, but letdown flow behavior indications the opposite ○ Takes manual control of PCV-135 (VB2). ○ Adjusts PCV-135 using alternate indications (Letdown flow rate, net charging, etc.) or from knowledge of normal demand setting for PCV-135 Hand Controller (VB2).
		(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 3 **Page** 9 **of** 21

Event Description: **PT-135, Transmitter for Letdown Pressure Control Valve, Fails High (continued)**

Time	Position	Applicant's Actions or Behavior
(AR PK04-21, "LETDOWN PRESS / FLO TEMP", continued)		
	SRO	• Notes letdown flow can be controlled with PPCV-135 in manual from previous step. ○ (2.1.5) Step is N/A - letdown flow is controlling properly in manual; it is not necessary to isolate letdown.
	SRO/ATC	• Determines remainder of PK steps do not match plant conditions ○ (2.1.6) Step is N/A - Letdown Heat Exchanger outlet temperature is NOT high (normal band). ○ (2.1.7) Step is N/A - Charging flow was slightly low; may adjust as needed to maintain Pressurizer level within established bands. ○ (2.1.8) Step is N/A - Charging appears norm (not lost).
	SRO/BOP	• Determines remainder of PK steps do not match plant conditions: ○ (2.1.9) Step is N/A - There are no indications that RV-8117 has lifted (PRT temperature, level, and pressure are all normal). ○ (2.1.10, 11, 12, 13) Step is N/A - Letdown is not at risk; normal Letdown alignment should be maintained.
	SRO	• May review probable causes for the alarm and identify PT-135 failed high. • May reference **OP AP-5, Malfunction of Eagle 21 Protection or Control Channel** to aid in diagnostics.
(OP AP-5, "Malfunction of Eagle-21 Protection or Control Channel") if used, else mark N/A		
Note: Only step 1 is applicable to the malfunction; remaining steps have not been listed.		
	SRO/ATC	• (1) Determines primary and secondary control systems was NOT controlling properly in AUTO, performs RNO actions: ○ Takes manual control of PCV-135 (VB2). ○ Adjusts PCV-135 using alternate indications (Letdown flow rate, net charging, etc.) or from knowledge of normal demand setting for PCV-135 Hand Controller (VB2).
Proceed to the next event once PCV-135 is being controlled properly in MANUAL, per Lead Examiner		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 4 **Page** 10 **of** 21

Event Description: **30 gpm SGTL on loop 4**

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnoses Steam Generator Tube Leak from one or more of the following: • Increased charging flow (PPC, CC2). • Air ejector off-gas hi-rad in alarm (PPC, RM-15/15R) (PK11-06). • Steam generator blowdown hi-rad and/or isolation (PPC, RM-19,23) (PK11-17).
	ATC	• Observes PK11-06 input 423 (SJAE Hi-Rad) alarming and informs the Shift Foreman.
	ATC/BOP	• May check PPC and/or VB2 Recorders (lower left) for upscale readings/ trends on rad monitors.
(AR PK11-06, "SJAE HI-RAD", starting at step 2.1) if entered, otherwise this section is N/A		
	SRO/BOP	• (2.1.1) Checks for upscale readings on both RM-15 and 15R (PPC, RCDR-3 VB2 lower left) (both are in alarm; may be over ranged). ○ (2.1.1.a) Implements OP O-4, "Primary to Secondary Steam Generator Tube Leak Detection". ○ (2.1.1.b) Notifies Chemistry of abnormal condition. ○ (2.1.1.c) Transitions to OP AP-3, "Steam Generator Tube Failure".
Note: Review of OP O-4 shutdown criteria is also covered as part of OP AP-3, "Steam Generator Tube Failure" (if not addressed during AR PK11-06 response)		
	BOP	• Reviews OP O-4, "Primary to Secondary Steam Generator Tube Leak Detection" for action levels and shutdown criteria. • Evaluates OP O-4 action level using PPC Group Display. • Determines current OP O-4 action level as 3 (leak >= 100 gpd) and updates Shift Foreman.

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 4 **Page** 11 **of** 21

Event Description: **30 gpm SGTL on loop 4 (continued)**

Time	Position	Applicant's Actions or Behavior
(OP AP-3, "Steam Generator Tube Failure")		
	SRO	• Reads NOTE prior to step 1 regarding requirement to complete procedure actions unless superseded by EOP E-3 , "Steam Generator Tube Rupture".
Note: Maintaining Pressurizer level stable is a Continuous Action. Associated RNO steps are performed when crew reports applicable conditions exist (i.e unable to maintain pressurizer level).		
	SRO/ATC	• (1) Checks pressurizer level and charging flow. ○ (1.a) May take charging to MANUAL control and attempt to adjust charging and seal flow to maintain pressurizer level (CC2).
	SRO/BOP	○ (1.a RNO) May start additional charging pump IF requested by ATC (VB2)
	SRO/ATC	○ (1.b) Checks for continuing decrease in pressurizer level. ▪ Determines leak rate is approximately 30 gpm. ▪ Readjusts charging and seal flow (CC2). ▪ Determines pressurizer level is stable (CC2, PPC) (Continuous Action to Monitor). ▪ May isolate Letdown by closing 8149C and LCV-459/460 (VB2).
	SRO/BOP	• (2) Identify affected steam generator. ○ (2.a) Determines that no S/G levels are rising unexpectedly (VB3 meters, PPC). ○ (2.b) Identifies main steamline rad monitor 74 rising (VB2 recorders, upper left; PPC). ○ (2.c) Verifies S/G blowdown isolation/sample valves open (VB3 lower left). (Depending on pace of crew, blowdown may have isolated due to high rad on RM-23; RNO step is performed to allow sampling by chemistry). ▪ (2.c RNO) Checks blowdown isolation due to RM-23 in alarm (PPC, RCDR-3 VB2 lower left); Places RE-19, 23 Hi Rad S/G Blowdown and Sample Valve iso defeat cutout switch to "cut-in" and opens blowdown sample valves (FCV-244, 246, 248, 250) (VB3, lower left). ○ (2.d) Contacts Chemistry to perform S/G sampling per CAP AP-1.

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 4 **Page** 12 **of** 21

Event Description: **30 gpm SGTL on loop 4 (continued); Ramp Offline**

Time	Position	Applicant's Actions or Behavior
(OP AP-3, "Steam Generator Tube Failure")		
	SRO/ATC	• (3-Continuous Action to Monitor) Determines VCT level can be maintained by RCS makeup (CC2,VB2, PPC).
	SRO	• (4) Determines plant shutdown requirement. ○ (4.a) Determines leak rate greater than O-4 shutdown criteria. ○ (4.b) Due to O-4 criteria, implements OP AP-25, Rapid Load Reduction or Shutdown. ○ Reviews T.S. 3.4.13.B, RCS Operational Leakage, – Primary to secondary LEAKAGE. Required actions: Be in MODE 3 within 6 hours.
(OP AP-25, "Rapid Load Reduction or Shutdown")		
	SRO	• (1.a) Determines runback/programmed ramp is not in progress (may not vocalize, since this ramp is initiated by the crew).
	SRO/BOP	• Starts load reduction (guidance is also on lamicoid pegboard on CC3): ○ (1.b) Places MW and IMP feedbacks in service (all on Triconex turbine HMI, CC3). ○ (1.c,d) Sets load target and ramp rate (greater than or equal to 5 MW/min) ○ (1.e) Pushes GO. ○ (1.f) Contacts Chemistry to advise 15%/hr shutdown rate will be exceeded.
	SRO/ATC	• (2) Ensures control rods are inserting in AUTO (CC1). • (3) Turns on Pressurizer heaters if not on from earlier event (CC1). • (4) Checks charging adequate to prevent flashing in the letdown system; may take manual control to ensure adequate flow (CC2).
	SRO/BOP	• (5) Ensures DFWCS is controlling S/G levels in AUTO (MFW control/bypass valves; MFPs all in AUTO) (CC2)(VB3).
		(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 4 **Page** 13 **of** 21

Event Description: **Tube Rupture during ramp offline**

Time	Position	Applicant's Actions or Behavior
Note: **Boration values described below may vary based on the actual ramp rate and target specified by SRO.**		
	SRO/ATC	• (6) Performs boration (the following guidance is on the boration checklist in the reactivity handbook). ○ Presses STOP on M/U Ctrl HMI (CC2). ○ Presses BORATE on HMI. ○ Sets target gallons for boration; verifies batch is reset. ○ Sets boric acid flowrate. ○ Presses START, and monitors boration. ○ Once stopped, either returns to AUTO (presses AUTO, then START), or performs additional boration per the Shift Foreman(CC2).
	SRO/BOP	• (7) Checks MFP suction pressure greater than 260 psig (VB3).
	SRO/ATC	• (8) Checks Tavg trending to Tref (PPC, CC1). • (9) Checks Pressurizer pressure and level trending to programmed band (PPC, CC2). • Reports rapid decrease in Pressurizer pressure and level. • Returns to OP AP-3, step 1.a RNO.
(OP AP-3, "Steam Generator Tube Failure", starting at step 1.a RNO)		
	SRO/BOP	• (1.a RNO) Starts additional CCP (if not done earlier). • (1.b RNO) Isolates letdown (if not done earlier).
	ATC	• Reports PZR level cannot be maintained.
	SRO	• Directs Rx trip/SI and transition to E-0.
	ATC	• Performs Rx trip and SI.

(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 5,6,7 **Page** 14 **of** 21

Event Description: Reactor Trip / Safety Injection

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Reactor Trip or Safety Injection")		
	SRO/ATC	• (1) Verifies reactor trip (trip bkrs open, rods on bottom, NIs decreasing) (VB2, CC1). • (2) Verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps).
	SRO/BOP	• (3) Checks vital 4kv bus status (VB4, vital buses F/H white lights on mimic buses). ○ Reports differential on bus G following transfer to startup power.
	SRO/ATC	• (4) Checks SI actuated (PK08-21 ON, also checks VB1 red train light ON and/or train equipment to verify both trains actuated). ○ Both trains of SI actuated as indicated by PK08-21, SI red light above Monitor Light Box C (VB1), and both trains of SI/RHR pumps running (VB1 skirt).
	SRO	• (5) Directs implementation of App E (usually given to BOP); See page **19.** ○ All failures are related to loss of 4kV Bus G. Field Operators should be assigned to manually close associated valves. ○ Board manipulations are as follows: ▪ Switch LCV-12 to CONT ONLY (VB3). ▪ Main Feedwater Recirc Valves FCV-53 & 54: OPEN (VB3). ▪ Turn on Aux bldg vent charcoal filter preheater (VB4).
	SRO/ATC	• (6) Checks RCS temperature stable or lowering to 547°F. ○ AFW Pp 1-2 OOS; 1-3 is running (VB3). ○ TDAFW is running and required (VB3). • (7) Checks Pzr PORVs and Pzr Safeties and Spray Valves. ○ Safeties closed; no sonic flow, tailpipe temperature normal (VB2). ○ PCV-456 is closed with 8000C open; PCV-474 is closed – may restore power to 8000A (VB2). ○ Pzr Sprays closed (green lights on) (CC2). • (8) Checks RCP trip criteria; ○ RCS WR Pressure is greater than 1300 PSIG, trip criteria, however RCP 1-2 and 1-4 tripped off on loss of 12kV Bus D (VB2).

(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 5 **Page** 15 **of** 21

Event Description: **Reactor Trip / Safety Injection (continued)** (CT)

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Reactor Trip or Safety Injection") (continued)		
	SRO/ATC	• (9) Determines S/G are NOT faulted. ○ No S/G lowering in an uncontrolled manner or completely depressurized.
	SRO/ATC	• (10) Checks for ruptured S/G. ○ Notes RE-74 elevated with and S/G 1-4 level rising. ○ Directs transition to EOP E-3, "Steam Generator Tube Rupture".
(EOP E-3, "Steam Generator Tube Rupture")		
	SRO/ATC	• (1) Notes RCPs are not running (VB2).
	SRO/ATC	• (2) Identifies S/G 1-4 as ruptured (RM-74 in alarm; indications of rising level without feed during E-0).
	SRO/BOP	• (3) Implements Appendix FF to isolate ruptured S/G 1-4 (see pg **21 – contains CT step**)
	SRO/ATC	• Reads CAUTION regarding maintaining isolation of Faulted/Ruptured S/G (do not feed). • (4.a) Notes ruptured S/G level is greater than 15%. • (4.b) Isolates Feed flowpaths to S/G 1-4: ○ **Takes LCV-113 to MANUAL and closes the valve (S2CT-1)(partial) **** ○ **Directs field action to close of LCV-109 (S2CT-1)**** ****(Critical Task) (S2CT-1) Isolate the ruptured steam generator from the intact steam generators prior to commencing cooldown of the RCS in step 10.b (10% steam dump)**
	SRO/ATC	• (5) Checks ruptured S/G pressure greater than 225 psig.

(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 5 **Page** 16 **of** 21

Event Description: **Reactor Trip / Safety Injection (continued)**

Time	Position	Applicant's Actions or Behavior
(EOP E-3, "Steam Generator Tube Rupture", continued)		
	SRO	• Reads CAUTION regarding false PTS (Integrity Status Tree indication) for ruptured loop. • (6.a) Determines required cool down target Core Exit Temperature from table based on current ruptured S/G pressure.
	SRO/ATC	• (7) Determines Condenser is NOT available. ○ PK08-14 – OFF. ○ Goes to step 10.

LOWEST RUPTURED SG PRESS (PSIG)	REQ'D CORE EXIT TEMPERATURE (°F)
1050 and above	516
1030 to 1049	513
1000 to 1029	510
900 to 999	497
800 to 899	483
700 to 799	467
600 to 699	450
225 to 599	350

(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC Scenario No.: 2 Event No.: 5 Page 17 of 21

Event Description: Reactor Trip / Safety Injection (continued) (CT)

Time	Position	Applicant's Actions or Behavior
(EOP E-3, "Steam Generator Tube Rupture", continued)		
	SRO/ATC	• (10) Initiates RCS Cooldown Using 10% Steam Dumps. ○ (10.a) Verifies Appendix FF is complete. ○ (10.b) **Manually opens PCV-19, 20, and 21 (10% Steam Dumps) to at least 90% to dump steam at maximum possible rate. (S2CT-2) **** ○ (10.c) Continues on in procedure at step 11 while cooldown continues. ○ (10.d) **Stops the cooldown when ALL Core Exit Thermocouples are less the required target temperature. (S2CT-2) **** ○ (10.e) Stabilizes temperature slightly less than required temperature using steam dumps in AUTO. ****(Critical Task) (S2CT-2) Perform RCS cooldown at maximum rate to CETC target temperature specified in E-3, step 6, using 10% steam dumps such that RCS subcooled margin still exists following the cooldown.**
	SRO/BOP	• (11.a,b) Maintains intact S/G levels while controlling S/G NR levels between 20%-65%. • (11.c) May throttle TDAFW flow to maintain level within band.
	SRO/BOP	• (12) CHECK PZR PORVs and Block Valves. ○ (12.a,c) Notes power is available to block valve 8000C and valve is open. ▪ Directs field operator to restore power to 8000A (if not done earlier). ○ (12.b) PZR PORVs – all closed.
	SRO/BOP	• (13) Resets Safety Injection (VB1).
	SRO/BOP	• (14) Resets both Trains Phase A (Phase B was not in) (VB1).
	SRO/BOP	• (15) Restores Instrument Air to Containment and checks header pressure greater than 90 psig (VB4).

(Continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 5 **Page** 18 **of** 21

Event Description: **Reactor Trip / Safety Injection (continued) (CT)**

Time	Position	Applicant's Actions or Behavior
(EOP E-3, "Steam Generator Tube Rupture") (continued)		
	SRO/BOP	• (16) Shuts down RHR pump 1-2.
	SRO/ATC	• (17) Checks RCS cooldown stopped before continuing on to depressurization of RCS.
	SRO/BOP	• (18) Checks ruptured S/G pressure stable or rising.
	SRO/BOP	• (19) Checks Subcooling greater than 40°F.

	SRO/BOP	• Reads note regarding use of a PORV for depressurization if normal spray is determined to be ineffective.
		• (20) Notes RCP 1-2 not running and determines normal Pressurizer Spray will not be effective.
		• (21) Depressurizes the RCS using one PZR PORV:
		  • **Reduces RCS pressure until criteria of Appendix GG has been met: (S2CT-3) ****
		  ○ **RCS Pressure - LESS THAN Ruptured S/G Pressure**
		  AND
		  ○ **PZR Level – GREATER THAN 12% [40%]**
		  OR
		  ○ **PZR Level – GREATER THAN 74% [66%]**
		  OR
		  ○ **RCS Subcooling Based on Core Exit T/Cs LESS THAN 20°F (Subcooled Margin Monitor, YI-31 or Appendix C)**
		
		****(Critical Task) (S2CT-3) Depressurize the RCS until Appendix GG criteria has been met.**

The scenario is terminated once critical task S2-CT3 is complete.		

Op-Test No.: L181-NRC Scenario No.: 2 Event No.: 5 Page 19 of 21

Event Description: SGTR (S/G 1-4) (cont)

Time	Position	Applicant's Actions or Behavior
(EOP E-0, Appendix E - ESF Auto Actions, Secondary and Auxiliaries Status)		

	BOP	Implements App E (ESF Auto Actions, Secondary and Auxiliaries Status):
		• (1a) Checks no personnel in Containment (part of turnover; may not voice).
		• (1b) Announces reactor trip/SI on PA system.
		• (2) Checks main generator – tripped (PK14-01 is ON).
		• (3) Verifies Phase A (VB1, ESF status lights, red lights ON, some white lights ON).
		  ○ Determines all failures are related to loss of 4kV Bus G.
		• (4) Verifies Containment Vent Isolation complete - red lights ON, white lights OFF (VB1).
		• (5) Verifies ESF (SI) actuation complete - red lights ON, some white lights ON (VB1).
		  ○ Determines all failures are related to loss of 4kV Bus G.
		• (6) Verifies Feedwater isolation complete (F.W. Isolation and S.G. Level Portions of Monitor Light Box C: red lights ON, white lights ON (VB1).
		  ○ Determines all failures are related to loss of 4kV Bus G.
		• (7) Determines Containment Spray and Phase B Isolation are NOT required (Contmt Isol, Phase B portion of Monitor Light Box D: red lights are OFF (VB1)).
		• (8) Checks Main Steamline Isolation complete (Main Steam Isolation portion of Monitor Light Box D: red light OFF, white light OFF (VB1)).
		• 9) Checks AFW status:
		  ○ AFW Pp 1-2 OOS; AFW Pp 1-3 running.
		  ○ TDAFW is running and IS required.
		• (10) Checks ECCS flows (charging injection (VB2), SI, RHR (VB1).
		  ○ Notes CCP 1-2 and 1-3 (VB2) off due to bus G loss.
		(11) Reports ESF and AFW status to the Shift Foreman (Shift Foreman may direct operator to continue on in Appendix E, or redirect to higher priority tasks).
		• (12) Checks excess letdown; notes NOT in service prior to trip (VB2).
		• (13) Checks secondary systems (MFPs tripped (VB2, green lights ON)
		  ○ Selects FCV-53/54 to recirc.
		  ○ Stops all but one CB Pp set.
		  ○ Takes LCV-12 control switch to CONT ONLY.

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 2 **Event No.:** 5 **Page** 20 **of** 21

Event Description: SGTR (S/G 1-4) (cont)

Time	Position	Applicant's Actions or Behavior
(EOP E-0, Appendix E - ESF Auto Actions, Secondary and Auxiliaries Status)		
	BOP	• (14) Checks proper operation of Aux Bldg and Control Rm vent systems (vent status light panel white lights)(VB4). ○ Placed both Unit 1 VENT TRAIN 1 BUS F and H MODE SELECT Switches to Mode-3 (VB4). • (15) Verifies available DGs running normally (freq (60), volts (120), speed (900))(VB4). • (16) Verifies vital batteries supplied by chargers (charger and bus volts)(VB5). • (17) Verifies MSRs reset (Triconex HMI)(CC3). • (18) Throttles RCP seal injection flows to normal if needed (FCV-128, to 8-13 gpm each, CC2). • (19) Checks PK11-04 NOT IN (SFP alarm). • (20) Notifies Shift Foreman of completion.
(Board Operator will rejoin crew upon completion of Appendix or when called upon by Shift Foreman)		

Op-Test No.: L181-NRC Scenario No.: 2 Event No.: 5 Page 21 of 21

Event Description: EOP E-3, Appendix FF, "Isolate Ruptured Steam Generator" (CT)

Time	Position	Applicant's Actions or Behavior
	(EOP E-3, Appendix FF, Isolate Ruptured Steam Generator)	
	BOP	Reads CAUTION regarding TDAFW as only source of feedflow prior to step 1. • (1) Reads step to ensure S/G 1-4 10% steam dump controller (PCV-22) set to 1040 psig and in AUTO (VB3). • (2) Checks S/G 1-4 10% steam dump valve closed (PCV-22) (VB3). • (3) Checks S/G 1-4 MSIV and bypass (FCV-44 and FCV-24) valves closed (VB3). ○ **Closes S/G 1-4 MSIV, FCV-44 (S2CT-1)(partial) **** • (4) Notes no TDAFW steam valves associated w/ S/G 1-4 (VB3). • (5) Verifies S/G 1-4 SGBD valves outside cnmt (FCV-160 and FCV-244) closed (VB3). • (6) Verifies S/G 1-4 is isolated from intact S/G (S/G 1-4 MSIV and MSIV Bypass are both closed as are all intact S/G MSIV and MSIV Bypasses). • (7) Informs Shift Foreman S/G 1-4 isolation is complete. ****(Critical Task) (S2CT-1) Isolate the ruptured steam generator from the intact steam generators prior to commencing cooldown of the RCS in step 10.b (10% steam dump)**

	BOP	• (8) Removes WR Thot input to SCMM for loop 4 (behind boards, PAMS panel behind VB3).
		  ○ Goes to PAM3 panel.
		  ○ Checks Loop 4 Thot Disabled.
		• (9) Contacts Chemistry to sample S/Gs per CAP AP-1.
		  ○ Ensures SI Reset (VB1).
		  ○ Ensures Phase A, Train A & B Reset (VB1).
		  ○ Open Instrument Air to Containment FCV-584 (VB4).
		  ○ When Chemistry is prepared to Sample, ensures Inside Containment S/G Blowdown Valves FCV-760-763 opened (VB3).

Attachment 1 – Scenario Set-up & Booth Actions

X = manual entry required

	TIME LINE	CONSOLE ENTRY	SYMPTOMS/CUES/DESCRIPTION
X	IC	RESTORE IC-11	75%; MOL, C_B – See Turnover
X	Setup	Lesson drl_0120.lsn	Clears AFW 1-2
	The Plant Abnormal Status Board for Surveillance Requirements		None
	Copies of Procedures, Attachments; Appendixes; Foldout Pages; Annunciator Response Procedures and commonly used forms are in binders and **NOT** Marked up		***AR PK04-06, PK04-21, PK05-16, 06-21, PK011-06, OP AP-3, AP-5, AP-13, AP-25, EOP E-0, E-3***
X	0 min	Tools > Simple SBT	Before crew takes the watch. Use Simple SBT, Data Recorder File: sbt_sim.drb, min 960 iterations (30 sec). Critical Task Specific Data Capture: • S2CT1: LCV-109 and LCV-113 valve position (or flow into S/G 1-4) • S2CT2: PCV-19, 20, 21 valve position; CETC (2 highest) • S2CT3: RCS Pressure, PZR Pressure, S/G 1-4 Pressure, Subcooling
X	0 min	Lesson L181 NRC-S2.lsn	After SFM reports the crew has taken the watch, load session MALS, OVRs, etc. by FILE or MANUALLY (below)
X	Evt-1: PCV-455A setpoint failure (approx. 3 min after taking watch per lead examiner)	Evt-1: PCV-455A Setpoint Failure Initial State: PENDING Delay Time: 00:00:00.000 insert H5ESP_INIT_455G 0 ramp=20 insert RCCIPCSDI_H5DHC455GSPUPTFFREEZE TRUE	Setpoint ramps to zero over 20 seconds and can not be reset.
X	Evt-2: PT-474 Fails Low (once pressurizer pressure returned to normal band, per lead examiner)	Evt-2: PT-474 Fails Low (AP-5) Initial State: PENDING Delay Time: 00:00:00.000 insert XMT_PZR24_3 1102 delay=0 ramp=1 insert VLV_PZR1_1 1 cd='NOT H_V2_195R_1' delay=0	Check for OOS stickers on PI-474 and PR-455 and pink tags. When contacted as Turbine Watch, open breakers for 8000A and 8000B when requested (see field action branch of lesson file).
X	Evt-3: PT-135 fails high (once Evt-2 TS addressed per lead examiner)	Evt-3: PT-135 Fails Hi (PK 04-21) Initial State: PENDING Delay Time: 00:00:00.000 insert XMT_CVC2_3 1 delay=0 ramp=75	PT-135 fails high.
X	Evt-4: 30 gpm tube leak on S/G 1-4 (once PT-135 being controlled in manual, per lead examiner)	Evt-4: S/G 1-4 30 gpm tube leak; ramp (AP-3, AP-25) Initial State: PENDING Delay Time: 00:00:00.000 insert MAL_RCS4H 30.0 delay=0 ramp=0	Crew will contact chemistry for sampling and power reduction > 15%/hr.
	Evt-5: 400 gpm tube rupture (Major) (triggers 30 sec after FCV-110A opening for boration)	Evt-5: S/G 1-4 400 gpm tube rupture (E-3) Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_RCS4H 400 cd='h_v2_272r_1' delay=30 ramp=60	Scenario Major – 400 gpm SGTR on S/G 1-4.
	Evt-6: 12 kV Bus D Feeder Breaker Diff (post trip)	Evt-6: 12kV Bus D Feeder Breaker Diff Trip Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_EPS5A_2 DIFFERENTIAL cd='H_V5_194B_1' delay=10 ramp=0 on=0 off=0	Results in loss of Condenser and RCPs 1-2 & 1-4.
	Evt-7: 4kV Bus G Diff on xfer to S/U (post trip)	Evt-7: Bus G Diff Trip on Xfer to S/U Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_EPS4D_2 DIFFERENTIAL cd='h_v4_221r_1' delay=2 ramp=0 on=0 off=0	Crew will contact field for closure of FCV-431 and control of TDAFW LCVs Note: Closing LCV-109 is part of the Critical Task to isolate the rupture S/G. Document the time isolation is requested and when crew notified complete: Time LCV-109 isolation requested: _____ Time notified:_____

X = manual entry required

Diablo Canyon Power Plant
Operations Shift Log

Unit 1

Unit 1 Days at Power: 111 Days

Operating Mode: 1
Power Level: 75%

Gross Generation: 860 MWe
Net Generation: 810 MWe

Today – Dayshift

Shift Manager Turnover:

PRA RISK STATUS NEXT SHIFT:	Green
GRID STATUS NEXT SHIFT:	Normal
AVERAGE RCS CALCULATED LEAKRATE:	0.01 gpm
CONDENSER INLEAKAGE:	< 0.01 gpd
CONDENSER D/Ps:	NW 5.7 SW 5.7 NE 5.7 SE 5.8 PSID
MAIN GENERATOR H2 USAGE:	325 scfd / 327 scfd 5 day ave
SPENT FUEL POOL:	Temp = 80°F; Time to 200°F = 30 hrs using actual temp (F-ID-7A)

NEW EMERGENT WORK:
- MDAFW 1-2 OOS due to low dP during routine surveillance test

SHUTDOWN TECH SPECS / ECGS:
- TS 3.7.5.B → MDAFW 1-2, OOS due in 68 hours.

ECG ACTIONS THAT IF COMPLETION TIME NOT MET ECG 0.3 IS ENTERED:
- None

TURNOVER ITEMS:
- MDAFW 1-2 estimated RTS is 8 hours
- Unit is operating at 75% due to a SCCW Hx Clearance

PRIORITY ITEMS FOR NEXT SHIFT:
  - MDAFW 1-2 repair

Shift Foreman Turnover

ANNUNCIATORS IN ALARM:

- There are no unexpected alarms - all current alarms are consistent with current mode and power level.

TURNOVER ITEMS:

- U-1: maintain 75% - no one in containment.
- U-2: maintain 100%.

REACTIVITY MANAGEMENT:

- Time in core life: _MOL_.
- Power History: Steady State at 75% for past 3 days.
- Boron concentration is _966 ppm_ from a sample taken 2 hours ago.
- Control Rod Height: 194 steps on CBD.
- Diluting the RCS approximately _25_ gallons every 1.5 hrs.
- The last dilution was completed _30 minutes_ ago.

CONDITIONAL SURVEILLANCES & INCREASED MONITORING:

- None

OTHER ABNORMAL PLANT STATUS

- None

Facility: Diablo Canyon (PWR) **Scenario No:** 3 **Op-Test No:** L181 NRC

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: 100% Power, MOL with AFW 1-2 cleared

Turnover:

Event No	Malf No.	Event Type*	Event Description (See Summary for Narrative Detail)
1	PMP_CVC3_2 OVERLOAD_DEV_FAIL	TS, C (ALL)	CCP 1-3 OC Trip (**OP AP-17, ECG 8.1.A**).
2	AS01ASW_ASP11_MTFSEIZUR 1	TS, C (BOP, SRO)	ASW Pp 1-1 Seizes; Pp 1-2 can not be started (**OP AP-10, TS 3.0.3**).
3	MAL_CWS3A 80 MAL_CWS3B 75 MAL_CWS1A 0.15 ramp=120 MAL_CWS1B 0.15 ramp=150	C (ALL)	High DP on Intake Screens; ramp required (**AR PK13-01, OP AP-7, OP AP-25**).
4	PMP_CWS1_2 OVERLOAD_DEV_FAIL cd='smss lt 1140' PMP_CWS2_2 OVERLOAD_DEV_FAIL cd='smss lt 1080'	M (ALL)	Both Circ Water pumps trip off during ramp, requiring Reactor Trip (**OP AP-7**).
5	MAL_EPS4C_2 DIFFERENTIAL cd='fnispr lt 5' delay=30	C (ALL)	Vital 4kV Bus F differential trip.
6	VLV_PZR4_2 0.3 cd='jpplp4' del ay=60	C (BOP)	Pressurizer PORV PCV-455C fails slightly open on trip requiring manual isolation by associated block valve
7	MAL_AFW1 1 cd='fnispr lt 5'	C (ALL)	Turbine driven AFW pump overspeed trip.

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
1. Total malfunctions (5–8) (Events 1,2,3,4,5,6,7)	7
2. Malfunctions after EOP entry (1-2) (Events 5,6,7)	3
3. Abnormal events (1–4) (Events 1,2,3)	3
4. Major transients (1-2) (Event 4)	1
5. EOPs entered/requiring substantive actions (1–2) (E-0.1, FR-H.1)	2
6. EOP contingencies requiring substantive actions (0–2) (FR-H.1)	1
7. Critical tasks (2–3)(See description below)	2

Critical Task	Justification	Reference
(S3CT-1) Close the block MOV upstream of the stuck open PORV prior rupture of the PRT.	The open PORV and block valve constitute the degradation of a fission product barrier. Closing the block valve is essential to safety since failure to do so results in the unnecessary continuation of the degraded condition.	• Westinghouse Owner's Group WCAP-17711-NP
(S3CT-2) Establish a secondary heat sink as indicated by: • WR level rising • Core Exit Thermocouple temperatures lowering Prior to reaching bleed and feed criteria which is defined as wide range S/G level in any three S/Gs less than 18% [26%] AND narrow range S/G level in all four S/Gs less than 15% [25%] narrow range.	A loss of all feedwater transient is characterized by a depletion of secondary inventory and eventual degradation of secondary heat transfer capability. As secondary heat transfer capability degrades, core decay heat generation will increase RCS temperature and pressure causing loss of RCS inventory similar in nature to a small break loss of coolant accident. Failure to restore a secondary heat sink when it is possible to do so constitutes "a significant reduction of safety margin beyond that irreparably introduced by the scenario."	• FR-H.1 Background Document (HFRH1BG), Rev. 3.
Per NUREG-1021, Appendix D, if an operator or crew significantly deviates from or fails to follow procedures that affect the maintenance of basic safety functions, those actions may form the basis of a CT identified in the post-scenario review.		

SCENARIO SUMMARY – NRC #3

1. Charging Pump CCP 1-3 trips on over current. The crew responds by entering **OP AP-17, Loss of Charging** to restore normal charging and letdown. Shift Foreman enters **ECG 8.1.A – Charging Pump No. 3 Inoperable** (establish continuous fire watch immediately; restore to operable status within 7 days).

2. ASW Pump 1-1 trips due to a seized shaft. Standby ASW Pump 1-2 fails to autostart and cannot be started manually. The Shift Foreman implements **OP AP-10, Loss of Auxiliary Salt Water** and cross-ties to the Unit 2 ASW system via the ASW cross-tie valve FCV-601. Shift Foreman enters **T.S. 3.0.3** for two trains of ASW inoperable on Unit 1.

3. Screen differential pressure begins to rise quickly, bringing in **AR PK13-01, Bar Racks/Screens**. Following annunciator guidance, the crew enters **OP AP-7, Degraded Condenser, Section C: Traveling Screen Problem** and begins to reduce load to 50% or less per **OP AP-25, Rapid Load Reduction**.

4. Both Circ Water pumps trip off during ramp, requiring the crew to manually trip the Reactor oper OP AP-7. The crew enters **EOP E-0, Reactor Trip or Safety Injection** and performs their immediate actions.

5. On the trip, vital 4 kV bus F trips on differential. DRPI loses power, but crew is able to determine the reactor has tripped based on diverse indications (lowering reactor power and reactor trip breakers open). MDAFW Pump 1-3 is also lost due to the bus failure.

6. Board operators also identify PCV-455C in mid-position. The valve will not close and must be isolated using the associated block valve 8000B **(S3CT-1) Close the block MOV upstream of the stuck open PORV prior rupture of the PRT.**

7. The TDAFW pump trips on overspeed. Steam Generator levels are initially high enough to provide an adequate secondary side heat sink and the crew transitions to **EOP E-0.1, Reactor Trip Response** to stabilize the plant. Steam Generator levels slowly lower below the minimum required level of 15% narrow range and the crew transitions to **EOP FR-H.1, Response to Loss of Secondary Heat Sink**. With the condenser unavailable, Condensate is used to restore a secondary side heat sink **(S3CT-2) Establish a secondary heat sink.**

The scenario is terminated once Critical Task S3CT-2 is complete

Op-Test No.: L181-NRC **Scenario No.:** 3 **Event No.:** 1 **Page** 1 **of** 14

Event Description: **Centrifugal Charging Pump 1-3 OC Trip**

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnosis of CCP 1-3 OC trip is made from one or more of the following: • CCP 1-3 blue OC light is lit, and the pump is no longer running (VB2, lower center). • PK04-16 CCP 1-3 alarm (OC trip input). • PKs 05-01 – 05-04, due to RCP seal low flow alarms. • Observes low charging flow and/or RCP seal flows (CC2, PPC, VB2 meters). • Observes letdown has isolated (VB2, upper skirt).
	SRO	Implements OP AP-17, "Loss of Charging, Section A, Loss of All Charging."
(OP AP-17, "Loss of Charging - Section A, Loss of All Charging")		
	SRO/BOP	• (1.a) Ensures Letdown is isolated: ○ Checks 8149A, 8149B, and 8149C closed (VB2).
	SRO/BOP	• (2.a) Ensures suction flow path: ○ Checks VCT level and pressure – normal (VB2, PPC). ○ Checks LCV-112B and LCV-112C open (CCP suction) (VB2, lower center).
	SRO	• (2.b) Determines that pump venting not required at this time.
	SRO/BOP	• (2.c) Verifies 8105 and 8106 are open (CCP recircs) (VB2, lower center).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC Scenario No.: 3 Event No.: 1 Page 2 of 14

Event Description: Centrifugal Charging Pump 1-3 OC Trip (continued)

Time	Position	Applicant's Actions or Behavior
(OP AP-17, "Loss of Charging - Section A, Loss of All Charging", continued)		
	SRO/ATC	• (2.d,e) Places FCV-128, CHARGING PUMP FLOW CONTROL, in MANUAL and closes (CC2).
	SRO/BOP	• (2.f) Starts an available charging pump (CCP 1-1 or 1-2)(VB2).
	SRO/ATC	• (2.g,h) Adjusts charging in manual to return level to program (FCV-128) (CC2). • (3) Adjusts HCV-142 to maintain RCP seal flows 8-13 gpm (CC2). • (4.a) Checks Pzr level > 17% (CC2 recorder, PPC, VB2 meter).
	SRO/BOP	• (4.b) Checks letdown in service; determines normal letdown can be restored (VB2, upper left skirt).
(OP AP-17, "Loss of Charging – Appendix R")		
	BOP/ATC	• Reads CAUTION prior to step 1, App. R regarding high letdown temperature and the potential for lifting RV-8117. ○ (1.a) Checks FCV-355 open (it is) (VB1, lower left skirt). ○ (1.b) Opens TCV-130 to 40% demand (VB2, lower middle). ○ (1.c) Ensures 8149A,B, and C are closed (they are) (VB2, upper middle skirt). ○ (1.d) Opens LCV-459 and LCV-460 (VB2, upper middle skirt). ○ (1.e) Checks 8152 open (VB2, upper middle skirt). ○ (1.f) Opens PCV-135 to 60% demand (VB2, lower middle). ○ (1.g) Adjusts charging to ≈ 87 gpm (ATC) (CC2). ○ (1.h) Opens 8149B or C – 75 gpm orifice stop valve (VB2, upper middle skirt). ○ (1.i) Adjusts PCV-135 for 350 psig on PI-135 and returns to AUTO (VB2, upper middle). ○ (1.j) Adjusts TCV-130 for 90°F-110°F on TI-130 and returns to AUTO (VB2, upper middle). ○ (1.k) Checks RV-8117 Letdown Relief Valve tailpipe temperature to verify relief valve is seated (TI-129 VB2, middle).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 3 **Event No.:** 1 **Page** 3 **of** 14

Event Description: **Centrifugal Charging Pump 1-3 OC Trip (continued)**

Time	Position	Applicant's Actions or Behavior
(OP AP-17, "Loss of Charging – Appendix R", continued)		
	SRO/BOP	• (4.c) Adjusts charging in manual to return level to program by throttling FCV-128 for flow, and maintaining RCP seal flows 8-13 gpm using HCV-142 (CC2). • (5.a – d.) Checks VCT Makeup Control: ○ Checks VCT level 14% to 87% (LI-112 on VB2). ○ Reads NOTE prior to step 5.b. ○ Checks VCT pressure 15 to 60 psig (PI-135 on VB2). ○ VCT makeup control (YIC-100) in AUTO mode and set for current RCS boron concentration which is displayed on lamicoid above ATC PPC displays (CC2).
(OP AP-17, "Loss of Charging starting at section A, Loss of All Charging", continued)		
	SRO/BOP	• (5.e) Verifies instrument air is available (VB4 lower left area). • (6) Checks LCV-112B and LCV-112C open, providing suction from the VCT(VB2, middle skirt).
	SRO	• (7) Reviews Tech Specs and enters **ECG 8.1.A –** CCP 1-3 inoperable. Required actions: ○ Establish a continuous fire watch in the ECCS Centrifugal Charging Pump (CCP) room Immediately. OR ○ Inspect the ECCS CCP room with a fire watch once per hour. AND ○ Verify the ECCS CCP associated smoke detection equipment is OPERABLE. AND ○ Verify the ECCS CCP associated fire suppression system is OPERABLE. AND ○ Restore Charging Pump No. 3 to OPERABLE status within 7 days.
Proceed to the next event once ECGs are addressed, per the lead examiner		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 3 **Event No.:** 2 **Page** 4 **of** 14

Event Description: **ASW Pump 1-1 Seizure**

Time	Position	Applicant's Actions or Behavior
	ATC	Observes PK01-03 (ASW Pp OC trip) and PK01-01 (three low press / low dP inputs) alarming, and informs the Shift Foreman.
	ATC/BOP	Observes that 1-1 ASW Pp has a blue OC light (VB1, far left), and reports condition to the Shift Foreman.
(AR PK01-03, "Aux Salt Water Pumps") if entered, else N/A		
	SRO	• (1.0) Goes to section 2.1, due to OC trip inputs.
	SRO/BOP	• (2.1.1) Determines that the standby ASW pump is NOT running with normal current (did not start); takes 1-2 ASW pp to MAN, and attempts to start it.
	SRO	• (2.1.2) Determines ASW flow has NOT been restored; goes to OP AP-10, Loss of Auxiliary Saltwater.
(OP AP-10, "Loss of Auxiliary Salt Water")		
	SRO/BOP	• (1) Determines neither ASW pump is running. • (1.a,b,c RNO) Informs SM to contact Watch Commander. Determines Unit 2 ASW Pump 2-1 is available for cross-tie. Goes to Section 6. • (6.2.1) Directs Unit 2 to CLOSE 2-FCV-495 and OPEN 2-FCV-496. • (6.2.2) N/A • (6.2.3) Opens FCV-601 (VB1, lower far left skirt). • (6.2.4) Directs Unit 2 to start stand-by ASW Pump 2-1.
	SRO	• (1.e RNO) Implement **Tech Spec 3.0.3** for two trains of ASW inoperable. Required action: Initiate shutdown within 1 hour. Be in MODE 3 within 7 hours.
	SRO/BOP	• (1.f RNO) Contacts Aux Watch to stop any radwaste discharge in progress.
Proceed to the next event once Tech Specs addressed, per the lead examiner.		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 3 **Event No.:** 3 **Page** 5 **of** 14

Event Description: High Screen DP

Time	Position	Applicant's Actions or Behavior
	ATC	• Observes PK13-01 (Bar Racks/Screens) alarming, and informs the Shift Foreman.
(AR PK13-01, "Bar Racks/Screens")		
	SRO/ATC	• Reads CAUTION regarding potential screen damage. • (2.2.1) Checks the PPC "Intake Screens" display.
	SRO	• (2.2.2-2.2.4) N/A.
	SRO/BOP	• (2.2.5) Calls the Intake Watch to check if all available screens are running.
	SRO	• (2.2.6) N/A.
	SRO/ATC	• (2.2.7) Checks if screen D/P of ANY of the bays exceeds 15 inches, and if so, checks the associated screens are operating as follows: o CWP Bay 1-1 - Screens 1-1 through 1-3 running at or trending toward 30 fpm. o CWP Bay 1-2 - Screens 1-4 through 1-6 running at or trending toward 30 fpm. o U1 ASW Bay - Screen 1-7 running at or trending toward 10.8 feet per minute.
	SRO	• (2.2.8) Determines screen D/P cannot be reduced to less than 8 inches, IMPLEMENTs OP AP-7, "Degraded Condenser."
(OP AP-7, "Degraded Condenser – Section C, Traveling Screen Problem.")		
	SRO	• Reads Cautions about screen stalling, backflow concerns, and need for tripping the reactor if both Circ Water pumps are lost. • Reads Note about PPC indication.

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 3 **Event No.:** 3 **Page** 6 **of** 14

Event Description: **High Screen DP (continued)**

Time	Position	Applicant's Actions or Behavior
(OP AP-7, "Degraded Condenser – Section C, Traveling Screen Problem.", continued)		
	SRO/ATC	• (1) Checks Traveling Screen Status: o (1.a) Determines screen status is NOT normal. o (1.b) Determines screen differential pressure is greater than 8 inches. o (1.b RNO) Determines differential pressure is continuously above 8 inches and is NOT due to salp/jellyfish. ▪ Implements OP AP-25, "Rapid Load Reduction or Shutdown" to commence load reduction to 50% or less (**see page 7**).
	SRO/ATC	o (1.c) Checks screen differential pressure - 25 inches OR LESS. ▪ Notes that it is. Actions are the same as for differential pressure is continuously above 8 inches and is NOT due to salp/jellyfish. ▪ Proceeds with implementation of OP AP-25 (**see page 7**).
	SRO/ATC	o (1.d) Checks screens NOT overloaded. ▪ Screen differential pressure LESS THAN 70 inches. ▪ Each CWP in service has at least two operating screens.
Note: Evt-4, CWP Trip is expected to trigger before crew reaches remainder of procedure; subsequent steps have, been omitted.		
		(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 3 **Event No.:** 3,4 **Page** 7 **of** 14

Event Description: Ramp / Reactor Trip

Time	Position	Applicant's Actions or Behavior
(OP AP-25, "Rapid Load Reduction or Shutdown")		
	SRO	• Directs reduction of turbine load. ○ (1.a) Determines runback/programmed ramp is not in progress (may not vocalize, since this ramp is initiated by the crew).
	SRO/BOP	• Directs board operator to input ramp parameters (CC3): ○ (1.b) Places MW and IMP feedbacks in service (all on Triconex turbine HMI). ○ (1.c,d) Sets load target and ramp rate. ○ (1.e) Pushes GO. ○ (1.f) Contacts Chemistry to advise 15%/hr shutdown rate will be exceeded.
	SRO/ATC	• (2) Ensures control rods are inserting in AUTO (CC1). • (3) Turns Pressurizer heaters on (CC1). • (4) Checks charging adequate to prevent flashing in the letdown system; may take manual control to ensure adequate flow (CC2).
	SRO/BOP	• (5) Verifies DFWCS in AUTO and controlling S/G levels (CC3 MFW HMI, VB3, PPC): ○ (5.a) Checks MFW control and bypass valves in AUTO. ○ (5.b) Checks both MFPs and their controller in AUTO. ○ (5.c) May check level trends, as well as steam flow/feed flow trends (CC3, PPC, and/or big VB3 DFWCS electronic recorders).
Note: CWP 1-1 will trip 30 seconds after boration is started causing a programmed ramp to commence. CWP 1-2 will trip when generator output reaches 1080 MW. Shift Foreman may direct Reactor Trip at this time.		
	SRO/ATC	• (6) Initiates boration (CC2).
	ALL	• Identifies CWP 1-1 trip and notes programmed ramp in progress (VB4). • Identifies CWP 1-2 trip (VB4).
	SRO/ATC	• Directs/performs Reactor Trip.
Remaining Events Trigger Automatically		

** Critical Task

Op-Test No.: L181-NRC Scenario No.: 3 Event No.: 5,6,7 Page 8 of 14

Event Description: Reactor Trip (continued) (CT)

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Reactor Trip or Safety Injection")		
Note 1: On the trip, a loss of vital 4kV bus F and an overspeed trip of the TDAFW pump leaves the crew with no AFW flow. S/G levels are initially above the minimum required level of 15% NR, but lowering. Crew will enter E-0.1, "Reactor Trip Response", but will transition to EOP FR-H.1, "Response to Loss of Secondary Heat Sink", once all four S/G levels fall below 15% NR. **Note 2: PCV-455C partially opens on the trip, resulting in a critical task to close the associated block valve, 8000B.**		
	SRO/ATC	• (1) Verifies reactor trip (trip bkrs open, rods on bottom, NIs decreasing) (VB2, CC1) • (2) Verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps)
	SRO/BOP	• (3) Checks vital 4kv bus status (VB4, vital buses G/H white lights on mimic buses). ○ Reports differential on bus F. ○ (3 RNO) Refers to EOP ECA-0.3, "Restore 4kV Buses" while continuing in E-0.
	SRO/ATC	• (4) Checks for SI actuated (PK08-21 ON), checks safeguards bistable status light panel. ○ Reports Safety Injection has not actuated and is NOT required.
	SRO/BOP	• (4.a RNO) continued ○ Notes no one in containment per shift turnover. ○ Directs annoucement of Reactor Trip over Public Address System.
	SRO/ATC	• (4.a RNO) Checks feedflow greater than 435 gpm; notes 0 gpm flow, but S/G NR level IS greater than 15% in atleast one S/G. ○ Directs Transition to EOP E-0.1 "Reactor Trip Response".
	ANY	• Identifies PORV 455C partially open and attempts to close. Valve will not close. • **Closes PORV block valve MOV-8000B (VB2 lower right)**** ****(Critical Task) (S3CT-1) Close the block MOV upstream of the stuck open PORV prior to rupture of the PRT.**
		(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 3 **Event No.:** 5,7 **Page** 9 **of** 14

Event Description: Reactor Trip Response

Time	Position	Applicant's Actions or Behavior
(EOP E-0.1, "Reactor Trip Response")		
Note 1: Crew will continue to monitor S/G levels and transition to EOP FR-H.1, "Response to Loss of Secondary Heat Sink", once all four S/G levels fall below 15% NR. There is no requirement for crew to complete steps of E-0.1 once extreme challenge to secondary heat sink condition exists.		
	SRO/ATC	• (1) Checks RCS temperature stable or trending to 547°F based on RCS Loop Tavg (RCPs running) (VB2, lower center chart recorders or PPC). o If RCS temp < 547°F and decreasing: (Not: expected) ▪ checks steam dumps (VB3, indicator lights middle) and S/G blowdown isolation valves outside containment (VB3, lower left skirt) all closed. Also checks MSRs reset on on Turbine Control HMI (CC3). o RCS temp > 547°F and increasing: ▪ If required, sets 10% dump controllers to 1005 psig, (83.8% setpoint) (VB3, lower left). ▪ verifies dumps modulate open to control temperature at 547°F. o Monitoring of RCS temperature stable assigned as Continuous Action.
	SRO/BOP	• (2) Checks Feedwater Status: o (a) RCS temperature < 554°F (VB2, lower center chart recorders or PPC) (NOTE: expected). o (b) Checks if Feedwater Isolation has occurred. o (b.1) Feedwater Isolation portion of Monitor Light Box C (Red lights ON / White lights OFF) (VB1). (c) Checks total AFW flow greater than 435 GPM (VB3, upper middle).
	SRO/ATC	• (3) Checks Rods fully inserted (VB2-DRPI). o No DRPI due to loss of 4kV bus F (VB2) o Rx Trip breakers are open, power is lowering (VB2, CC1) o Determines reactor is tripped.
		(continued on next page)

** Critical Task

Op-Test No.: L181-NRC Scenario No.: 3 Event No.: 5,7 Page 10 of 14

Event Description: Reactor Trip Response (continued) (CT – may already be complete)

Time	Position	Applicant's Actions or Behavior
(EOP E-0.1, "Reactor Trip Response", continued)		
Note 1: Crew will continue to monitor S/G levels and transition to EOP FR-H.1, "Response to Loss of Secondary Heat Sink", once all four S/G levels fall below 15% NR. There is no requirement for crew to complete steps of E-0.1 once extreme challenge to secondary heat sink condition exists.		
	SRO/ATC	• (4) Checks Pressurizer level controls: ○ (a) Level greater than 17% (VB2, middle right). ○ (b) Charging in service with adequate flow (VB2)(CC2). ○ (c) Letdown in service (VB2, upper middle skirt). ○ (d) Pressurizer level trending to 22% (VB2, middle right). ○ (may adjust charging to maintain level 22% to 60%). ○ (e) May energize pressurizer heaters (CC1, lower left).
	SRO/ATC	• Reads CAUTION regarding Aux Spray and notes as N/A (Aux Spray not in service). • (5) Checks Pressurizer pressure control: ○ (a) Pressure greater than 1850 psig (VB2, far right). ○ (b) Pressure stable or trending to 2235 psig (VB2)(CC2). ○ (b RNO) **Directs closing of PCV-455C block valve, MOV-8000B, if not already completed (VB2 lower right)**** ****(Critical Task) (S3CT-1) Close the block MOV upstream of the stuck open PORV prior rupture of the PRT.)**
	SRO/BOP	• (6) Checks S/G NR levels greater than 15%: ○ (a) Reports all S/G NR levels greater than 15%, but lowering (VB3, upper middle). ○ (b) Reports with no AFW flow (VB3, upper middle). ○ (c, d) Checks TD AFW Pump required for heat removal. ▪ Reports TD AFW pump is tripped on overspeed (VB3, center skirt).
	SRO	• Directs transition to EOP FR-H.1, "Response to Loss of Secondary Heat Sink".

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 3 **Event No.:** 7 **Page** 11 **of** 14

Event Description: **Loss of Secondary Heat Sink**

Time	Position	Applicant's Actions or Behavior
(EOP FR-H.1, "Response to Loss of Secondary Heat Sink")		
	SRO	Enters EOP FR-H.1 (LOSHS) due to loss of AFW (complete) and low S/G levels.
	SRO/BOP	• (1) Determines total feedflow less than 435 gpm is NOT the result of operator actions.
	SRO/ATC	• (2) Determines Secondary Heat Sink is required. ○ (2.a) RCS Pressure is GREATER than any intact S/G ; (RCS pressure (VB2); S/G pressure (VB3)). ○ (2.b) RCS Hot Leg Temp is GREATER than 350°F; (VB2, lower (chart recorder)).
	SRO/ATC	• (3) Checks at least one ECCS CCP available. ○ (3.a) CCP 1-2 is either available or in service.
	SRO/BOP	• (4) Tries to establish AFW flow to at least one S/G: ○ (4.a) Verifies Blowdown and Sample isolation valves outside containment are closed (VB3, lower left skirt). ○ (4.b.1) Verifies CST level is GREATER than 10% (VB3, middle). ○ (4.b.2) Verifies none of the AFW pumps are running (VB3, middle). ○ (4.b-c RNOs) Dispatches operators to locally check lineups and investigate pump trips; May check on status on getting AFW 1-2 returned to service.
	SRO/ATC	• (5) Stops all four RCPs (VB2, right).
	SRO/BOP	• (6) Notes Condenser is NOT available due to loss of both CWPs (no vacuum). • (6 RNO) Adjusts 10% dump controllers to 1005 psig, (83.8% setpoint) (VB3, lower left).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC Scenario No.: 3 Event No.: 7 Page 12 of 14

Event Description: Loss of Secondary Heat Sink (continued) (CT)

Time	Position	Applicant's Actions or Behavior
(EOP FR-H.1, "Response to Loss of Secondary Heat Sink", continued)		
	SRO/BOP	• Reads CAUTION regarding monitoring of Hotwell level. • (7.a) Checks at least one Condensate Booster Pump Set running in recirc (VB3, center skirt).
	SRO/ATC	• (7.b) Takes manual control of all Main Feedwater Reg Valves and Main Feedwater Reg Valves Bypasses and sets demand to zero (DFWCS HMI on CC3).
	SRO/BOP	• (7.c) Checks Feedwater Isolation Valves open (VB3, lower left). • (7.d) Determines Main Feedwater is NOT available (Condenser NOT available) (PK08-14 NOT lit) and goes to step 9 (Establish Feed from Condensate System).
	SRO/ATC	Reads CAUTIONS before step 9.a regarding blocking/unblocking of automatic SI actuation. Reads NOTE regarding parallel performance of S/G and RCS depressurization (steps 9.c in parallel with steps 9.a-b) and the need to stop S/G depressurization if PK06-06 comes in before SI signal are blocked (needed to prevent unwanted SI): • (9.a.1) Depressurizes RCS to less than 1915 PSIG (P-11) using PCV-456 (VB2, lower right vertical). • (9.a.2) After P-11 actuates (PK08-06), blocks RCS low pressure SI ((2) train switches) and low steamline pressure SI signals ((2) train switches)(CC2). • (9.a.3) Maintains RCS pressure below P-11 (1500 and 1865 PSIG) using PORV (VB2).
	SRO/BOP	• (9.b.1) **Verifies Main Feedwater Isolation Valves OPEN (VB3, lower left)**** • (9.b.2) Verifies Main Feedwater Isolation signal OFF (PK09-11); resets as needed (VB3, center). ****(Critical Task) (Part of S3CT-2, Establish feedwater flow into at least one S/G prior to reaching bleed and feed criteria).**
		(continued on next page)

** Critical Task

Op-Test No.: L181-NRC Scenario No.: 3 Event No.: 7 Page 13 of 14

Event Description: Loss of Secondary Heat Sink (continued) (CT)

Time	Position	Applicant's Actions or Behavior
(EOP FR-H.1, "Response to Loss of Secondary Heat Sink", continued)		
	SRO/BOP	• (9.b.2) Verifies Main Feedwater Isolation signal OFF (PK09-11); resets as needed (VB3, center).
	SRO/ATC	• (9.b.3) **Throttles open Main Feedwater Reg Valves OR Main Feedwater Bypass Valves**** (CC3 DFWCS HMI). ****(Critical Task) (Part of S3CT-2, Establish feedwater flow into at least one S/G prior to reaching bleed and feed criteria).**
	SRO/BOP	• (9.b.4) Bypasses feedwater heaters and condensate demineralizers (FCV-55 and FCV-230) (VB3, skirt, lower right).
Note 1: Once the crew has successfully opened one of the 10% dump valves to 90% or greater, a corresponding safety will temporarily lift, causing pressure to lower faster, and then reseat. This malfunction is added to reduce scenario run time where the crew has no verifiable actions to perform and is simply monitoring the depressurization.		

	SRO/BOP	• Reads CAUTION before step 9.c regarding potential for low Tave Feedwater Isolation.
		• Reads NOTE about Low Tavg causing Feedwater Isolation and the need to reopen feedwater valves.
		• (9.c) **Depressurizes ONE intact S/G to LESS THAN 490 PSIG at MAXIMUM RATE****
		  ○ (9.c.1) Verifies all MSIV and MSIV bypass valves closed (VB3, lower left).
		  ○ (9.c.2) **Places one 10% dump valve in manual and opens to 90% or greater; Red indicator light ON, green indicator light OFF (VB3, middle)****
		****(Critical Task) (Part of S3CT-2, Establish feedwater flow into at least one S/G prior to reaching bleed and feed criteria).**

	SRO/ATC	○ (9.c.3) Checks charging in service; may maximize during depressurization to prevent losing Pressurizer level during the cooldown.
		(continued on next page)

** Critical Task

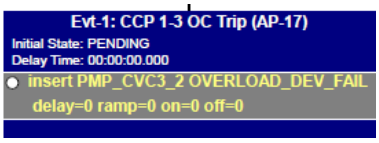
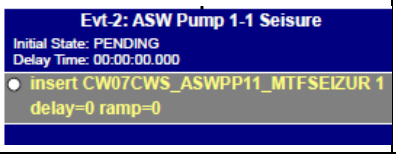
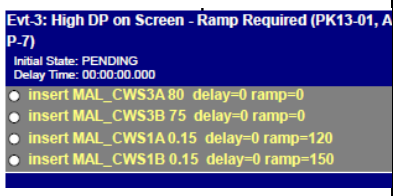
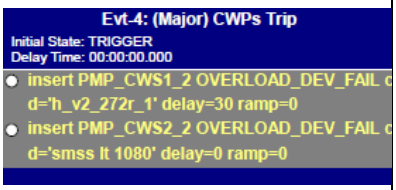
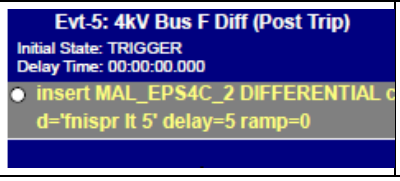
Op-Test No.: L181-NRC Scenario No.: 3 Event No.: 7 Page 14 of 14

Event Description: Loss of Secondary Heat Sink (continued) (CT)

Time	Position	Applicant's Actions or Behavior
(EOP FR-H.1, "Response to Loss of Secondary Heat Sink", continued)		
	SRO/BOP	○ **(9.c.4) Establishes feedflow to at least one S/G (VB3)**** ○ (9.c.5) Stabilizes depressurized S/G pressure at 480 PSIG (VB3). ▪ Sets depressurized S/G 10% dump valve setpoint to current S/G pressure, approx. 40% (or below) on controller. ▪ Returns controller to AUTO. ****(Critical Task) (Part of S3CT-2, Establish feedwater flow into at least one S/G prior to reaching bleed and feed criteria).**
Terminate the scenario once feedwater flow from the Condensate System is established, per the Lead Examiner		

Attachment 1 – Scenario Set-up & Booth Actions

X = manual entry required

	TIME LINE	CONSOLE ENTRY	SYMPTOMS/CUES/DESCRIPTION
X	IC	RESTORE IC-10	100%; MOL, C_B – See Turnover Sheet
X	Setup	N/A	AFW 1-2 OOS Verify Liquid Rad Discharge and Chlorination lamicoids lined up to the 1-2 Train
	The Plant Abnormal Status Board for Surveillance Requirements		Set CCP 1-2 boron concentration within 10 ppm of current boron concentration.
	Copies of Procedures, Attachments; Appendixes; Foldout Pages; Annunciator Response Procedures and commonly used forms are in binders and **NOT** Marked up		***AR PK01-01, PK01-03, PK04-16, PK05-01,02,03,04, PK13-01, OP O-4, O-28, AP-7, AP-10, AP-17, AP-25, EOP E-0, E-0.1, ECA-0.3, FR-H.1*** Provide Booth with copies of PK13-01 and AP-7
X	0 min	Tools > Simple SBT	Before crew takes the watch. Use Simple SBT, Data Recorder File: sbt_sim.drb, min 960 iterations (30 sec). Critical Task Specific Data Capture: • S3CT1: 8000B position and PRT parameters • S3CT2: Feedwater iso, reg, and bypass valve positions; 10% steam dump valve positions; S/G feedflow; S/G pressures; CETCs.
X	0 min	Lesson L181 NRC-S3.lsn	After SFM reports the crew has taken the watch, load session MALS, OVRs, etc. by FILE or MANUALLY (below)
X	Evt-1: CCP 1-3 OC Trip (approx. 3 min after taking watch per lead examiner)		Aux Watch reports burnt electrical smell in CCP 1-3 pump room. Turbine Watch reports no issues noted.
X	Evt-2: ASW Pp 1-1 Shaft Seizure (once Evt-1 TS addressed per lead examiner)		ASW 1-1 shaft seizure and OC trip; ASW 1-2 autostart failure.
X	Evt-3: Intake Screen High DP (once Evt-2 TS addressed per lead examiner)		When contacted as Intake watch: • Report Kelp attack; All screen running but heavily loaded.
X	Evt-4: CWPs Trip (Major) (triggers 30 secs after start of boration)		CWP 1-1 trips 30 seconds after FCV-110A starts to open (boration for ramp) triggering programmed ramp. CWP 1-2 trips @ 1080 MW.
X	Evt-5: 4kV Bus F Diff (post trip)		4kV Bus F Differential Trip – Loss of AFW 1-3 (part of Loss of Heat Sink).

(con't on next page)

Attachment 1 – Scenario Set-up & Booth Actions (con't)

X = manual entry required A

TIME LINE	CONSOLE ENTRY	SYMPTOMS/CUES/DESCRIPTION
Evt-6:PCV-455C partial opening (post trip)	Evt 6: PCV-455C slightly open on trip Initial State: TRIGGER Delay Time: 00:00:00.000 insert VLV_PZR4_2 0.3 cd='fnispr_1 lt 5' delay=0 r amp=0	PORV fails 30% open.
Evt-7 (TDAFW trip): (post trip)	Evt-7: TDAFW Overspeed trip Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_AFW1 1 cd='fnispr lt 5' delay=0 ramp=0	When contacted, report FCV-152 trip handle shattered.

Diablo Canyon Power Plant
Operations Shift Log

Unit 1

Unit 1 Days at Power: 111 Days

Operating Mode: 1
Power Level: 100%

Gross Generation: 1187 MWe
Net Generation: 1137 MWe

Today – Dayshift

Shift Manager Turnover:

PRA RISK STATUS NEXT SHIFT:	Green
GRID STATUS NEXT SHIFT:	Normal
AVERAGE RCS CALCULATED LEAKRATE:	0.01 gpm
CONDENSER INLEAKAGE:	< 0.01 gpd
CONDENSER D/Ps:	NW 5.7 SW 5.7 NE 5.7 SE 5.8 PSID
MAIN GENERATOR H2 USAGE:	325 scfd / 327 scfd 5 day ave
SPENT FUEL POOL:	Temp = 80°F; Time to 200°F = 30 hrs using actual temp (F-ID-7A)

NEW EMERGENT WORK:

- MDAFW 1-2 OOS due to low dP during routine surveillance test.

SHUTDOWN TECH SPECS / ECGS:

- TS 3.7.5.B → MDAFW 1-2, OOS due in 68 hours.

ECG ACTIONS THAT IF COMPLETION TIME NOT MET ECG 0.3 IS ENTERED:

- None

TURNOVER ITEMS:

- MDAFW 1-2, estimated RTS is 8 hours.

PRIORITY ITEMS FOR NEXT SHIFT:

- MDAFW 1-2 repair.

Shift Foreman Turnover

ANNUNCIATORS IN ALARM:

- There are no unexpected alarms - all current alarms are consistent with current mode and power level.

TURNOVER ITEMS:

- U-1: maintain 100% - no one in containment.
- U-2: maintain 100%.

REACTIVITY MANAGEMENT:

- Time in core life: _MOL_.
- Power History: Steady State at 100% for past 3 days.
- Boron concentration is _906 ppm_ from a sample taken 2 hours ago.
- Control Rod Height: 231 steps on CBD.
- Diluting the RCS approximately _25_ gallons every 1.5 hrs.
- The last dilution was completed _30 minutes ago.

CONDITIONAL SURVEILLANCES & INCREASED MONITORING:

- None

OTHER ABNORMAL PLANT STATUS

- None

Facility: Diablo Canyon (PWR) **Scenario No:** 4 **Op-Test No:** L181 NRC

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: 75% Power, MOL with D/G 1-2 OOS

Turnover: At 75% power for SCCW HX Clearance

Event No	Malf No.	Event Type*	Event Description (See Summary for Narrative Detail)
1	XMT_RMS3_3 1E+06 delIA XMT_RMS3_3 2 delay=15 XMT_RMS3_3 1e+06 cd='H_RM_C08B_1' delay=15	**TS, I (BOP, SRO)**	RE-3 spurious spike followed by high failure (**AR PK11-21, ECG 39.3.D**).
2	XMT_CVC19_3 0.0 ramp=120	**I (ATC, SRO)**	LT-112 Fails Low (auto make-up) (**OP AP-19, AP-5**).
3	MAL_RCS3B .07 MAL_RCS3B .09 cd='h_v2_265r_1 or h_v2_264r_1' delay=60 ramp=10	**TS, C (ALL)**	70 gpm RCS leak on Loop 2; increased to 90 gpm on start of 2nd CCP (**OP AP-1, TS 3.4.13.A**).
4	MAL_SEI1 0.21 ramp=10 MAL_GEN4_3 TRIP delay=10 cd='jmlsei1' LOA_SYD6 OPEN delay=15 cd='jmlsei1' LOA_SYD7 OPEN delay=15 cd='jmlsei1' LOA_SYD8 OPEN delay=15 cd='jmlsei1'	**C (ALL)**	Seismic event causing Full Load Rejection (**OP AP-2, AP-25**).
5	MAL_ROD13 TRUE cd='fnispr lt 55'	**M (ALL)**	Auto rod control insertion failure requiring reactor trip (**OP AP-2**).
6	MAL_SYD2 0 cd='fnispr lt 5' delay=2 MAL_EPS4E_2 DIFFERENTIAL cd='h_v4_217r_1' MAL_DEG1C_2 NO_RESET cd='H_V4_224R_1'	**M (ALL)**	Loss of all A/C power.
7	VLV_AFW7_1 1 DelIA VLV_AFW7_1 2 cd='V3_219S_3'	**C (BOP)**	TDAFW Pump fails to autostart – manual start required.

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
1. Total malfunctions (5–8) (Events 1,2,3,4,5,6,7)	7
2. Malfunctions after EOP entry (1-2) (Event 7)	1
3. Abnormal events (1–4) (Events 1,2,3,4)	4
4. Major transients (1-2) (Events 5,6)	2
5. EOPs entered/requiring substantive actions (1–2) (ECA-0.0, ECA-0.2)	2
6. EOP contingencies requiring substantive actions (0–2) (ECA-0.0, ECA-0.2)	2
7. Critical tasks (2–3)(See description below)	3

Critical Task	Justification	Reference
(S4CT-1) Establish a minimum of 435 gpm AFW flow before S/G reach dryout condition of 10% WR by starting the turbine drive AFW pump (AFW Pp 1-1).	After the initial RCS cooldown, decay heat increases the RCS temperature. Without an adequate secondary heat sink to support natural circulation, the S/Gs could not support any significant plant cooldown. Thus the crew would lose the ability to delay the adverse consequences of core uncovery.	• WCAP-17711-NP, CT-23 • ECA-0.0 Background Document (HECA00BG), Rev. 3.
(S4CT-2) Energize at least one vital AC bus from prior to implementation of FLEX strategies (ECA-0.0, step 10 RNO) associated with entry into Extended Loss of AC Power Event (ELAP) conditions	Failure to restore vital AC power from an available source when available represents an unnecessary continuation of a degraded electrical condition and unnecessarily complicates the mitigation strategy	• WCAP-17711-NP, CT-24 • ECA-0.0 Background Document (HECA00BG), Rev. 3.
(S4CT-3) Establish flow from at least one high head injection pump prior to transition out of ECA-0.2.	Failure to manually start at least one high/intermediate head injection pump under the postulated conditions constitutes misoperation or incorrect crew performance in which the crew does not prevent degraded core cooling capacity.	• WCAP-17711-NP, CT-7
Per NUREG-1021, Appendix D, if an operator or crew significantly deviates from or fails to follow procedures that affect the maintenance of basic safety functions, those actions may form the basis of a CT identified in the post-scenario review.		

SCENARIO SUMMARY – NRC #4

1. RE-3 (Oily Water Separator Effluent Line Radiation Monitor) spikes high momentarily, bringing in annunciator **AR PK11-21, High Radiation**. The crew identifies the signal as spurious and performs a reset of RM-3 per PK11-21, section 2.1.4. RE-3A fails high shortly after the reset and cannot be cleared. Shift Foreman enters **ECG 39.3.D, Radioactive Liquid Effluent Monitoring Instrumentation** (30 days).
2. Volume Control Tank (VCT) level channel LT-112 fails low, causing a continuous (and erroneous) makeup signal. The crew diagnoses the level channel failure by comparing other VCT parameters, and by using **OP AP-19, Malfunction of the Reactor Makeup Control System**. The makeup system is secured, and makeup is accomplished (if needed) using manual mode (or enabling the auto mode for short periods). Crew may elect to use **OP AP-5, Malfunction of Eagle 21 Protection or Control Channel** to take manual control of **Makeup Control System.**
3. A 70 gpm RCS leak develops, requiring entry in **OP AP-1, Excessive Reactor Coolant System Leakage**. Pressure. The leak increases to 90 gpm when a second charging pump is started and letdown must be isolated. VCT level can be maintained at the current leak rate, however, and the crew determines a plant shutdown is required. Shift Foreman enters **TS 3.4.13.A, RCS Operational Leakage** (4 hrs).
4. A significant seismic event results in a full load rejection on Unit 1. The crew recognizes the condition based on numerous power level alarms and the ensuing secondary side transient. The crew monitors primary and secondary system responses, most notably rod control, steam dumps, and digital feedwater, to ensure all systems respond appropriately in automatic. Shift Foreman implements **OP AP-2, Full Load Rejection** to stabilize the plant.
5. During the ramp down, automatic rod motion stops and the Shift Foreman directs a Reactor trip.
6. Startup power is lost on the trip followed by a bus differential fault on vital 4kV bus H. Diesel Generator 1-3 trips and cannot be reset. The crew transitions to **EOP ECA-0.0, Loss of All Vital AC Power.**
7. The turbine driven AFW pump fails to autostart requiring the crew to perform the critical task of manually starting the pump **(S4CT-1) Establish a minimum of 435 gpm AFW flow before S/Gs reach dryout conditions.**
8. Energy Trading informs the crew that 230kV start up power is not available, but 500 kV is expected back shortly. The crew performs actions to isolate RCP seal cooling.
9. Power is restored to vital 4kV buses F and G following the guidance of ECA-0.0, Appendix DD (Backfeed from 500kV Power) **(S4CT-2) Energize at least one vital AC bus from prior to implementation of FLEX strategies**.
10. The crew transitions to ECA-0.2, Loss of All AC Power with SI Required where they manually start safeguards equipment. The crew performs the final scenario critical task **(S4CT-3) Establish flow from at least one high head injection pump.**

The scenario is terminated once injection flow is established.

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 1 **Page** 1 **of** 16

Event Description: **Perform Weekly Aux Building Supply and Exhaust Fan Swap**

Time	Position	Applicant's Actions or Behavior
(OP H-1:II, "Auxiliary Building Safeguards Ventilation (ABVS) - Normal Operation")		
	BOP	• Reads Caution regarding starting of fan shortly after shutdown. • Reads Note regarding Buildings and Safeguards mode. • (6.1.1) Notes fans have been off for at least five minutes prior to start. • (6.1.2) Places Exhaust Fan Select Switch to E-2 and allows it to spring return to neutral. Notes indicator light change (VB4). • (6.1.3) Places Supply Fan Select Switch to S-32 and allows it to spring return to neutral. Notes indicator light change (VB4). • (6.1.4) Notes correct fan operation indicated on AFHBVS Monitor (VB4).
Note: E-2 trips 15 seconds after S-32 is started.		
(AR PK15-17, "AUX & FHB VENT PWR FAILURE") if used, else N/A		
	SRO/ATC	• Enters AR PK15-17, "Aux & FHB Vent Pwr Failure" for input 276, Aux Bldg Exh Fan E-2 UV or Lo Flo POV2.
	SRO/BOP	• (2.2) Fan Low Flow or Fan UV. • Reads NOTE regarding AC control power supplies. o (2.2.1) Checks that redundant exhaust fan train started automatically. ▪ (2.2.1.a) Notes E-1 restarts after slight delay. ▪ (2.2.1.b) Checks for correct damper alignment. ▪ (2.2.1.c) Dispatches an Operator to investigate and determine the cause of the fan failure. ▪ (2.2.1.d) Notes not running in Safeguards Only mode. o (2.2.2-2.2.4) N/A. o (2.2.5) Refers to TS 3.7.12.B for one ABVS train inoperable. Required action: Restore ABVS train to Operable status (7 days).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 1 **Page** 2 **of** 16

Event Description: **Perform Weekly Aux Building Supply and Exhaust Fan Swap (continued)**

Time	Position	Applicant's Actions or Behavior
(AR PK15-16, "Aux and FHB Vent Sys") if used, else N/A		
	SRO/ATC	• Enters AR PK15-16, "Aux & FHB Vent Sys" for input 311, AFHBVS Trouble POV2.
	SRO/BOP	• Reads note regarding operation of Tricon HMI screens on VB4. • (2.1) AFHBVS POV Trouble Alarms. o (2.2.1) Checks that redundant exhaust fan train started automatically. o (2.1.2) Contacts I&C to investigate trouble alarms. o (2.1.3) N/A o (2.1.4) May check for individual alarm input as follows: ▪ (2.1.4.a) Selects Active Alarms screen on Tricon HMI (VB4). ▪ (2.1.4.b) Refers to Attachment 2 for individual alarm description. o (2.1.5-2.1.6) N/A o (2.1.7) Refers to TS 3.7.12.B for one ABVS train inoperable. Required action: Restore ABVS train to Operable status (7 days).
(AR PK16-22, "480V BUS 1H") if used, else N/A		
	SRO/ATC	• Enters AR PK16-22, "480V Bus 1H" for input 301, 480V Bus-1H Mtrs TOL Trip.
	SRO/BOP	• (2.3) Motor Thermal Overload: o (2.3.1) Determines E-2 is the load that tripped. o (2.3.2) Verifies E-1 started automatically. o (2.3.3) May refer to OPS Policy B-2, "Electrical Alarm Relay Responses," to address the overload.
Proceed to the next event once Tech Specs are addressed, per Lead Examiner		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 2 **Page** 3 **of** 16

Event Description: **VCT Level Channel LT-112 Fails Low (causes auto makeup)**

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnosis of makeup control failure is made by one or more of the following: • Automatic makeup is running, but VCT level shows normal (LT-114) (PPC as L0112A, HSDP). • LT-112 shows low level (0%), but VCT pressure shows normal, and CCP operation (suction) is normal (all on VB2). • Yokogawa recorder (L0112A) (VB2 upper left).
	ATC	Takes Makeup Control to STOP (on the makeup control HMI, CC2) (may be done before or during entry into AP).
	SRO	Implements OP AP-19, "Malfunction of the Reactor Makeup Control System" or OP AP-5, "Malfunction of Eagle 21 Protection or Control Channel".
(For OP AP-19, "Malfunction of the Reactor Makeup Control System"), if entered, else N/A		
	SRO/ATC	• (1.a) Ensures M/U set to correct mode (AUTO and stopped based on unwarranted makeup) (CC2). • (1.b) Determines auto makeup should NOT be selected to start due to undesired makeup operation.
	SRO/BOP	• (2) Checks makeup system pumps and valves lineup up, and in AUTO (VB2, lower center).

	ATC/BOP	• (3) Verifies VCT level channels OPERABLE:
		  ○ Observes discrepancy between LT-112 (0%), and LT-114 (normal level).
		  ○ May use VCT pressure and/or normal CCP operation to diagnose that LT-112 has failed.

	ALL	• (3 RNO) May refer to Appendix A, "Guide to Failed VCT Level Channel", step 1.b.1 to determine what effect the failed LT-112 will have on makeup system operation.

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 2 **Page** 4 **of** 16

Event Description: **VCT Level Channel LT-112 Fails Low (causes auto makeup) (continued)**

Time	Position	Applicant's Actions or Behavior
(OP AP-19, "Malfunction of the Reactor Makeup Control System", continued)		
	ATC/BOP	• (4) Verifies CCP suction parameters are normal (CCP flow/amps/ pressure, VCT level/pressure; VB2 and CC2 meters) (as time permits).
	SRO	• (5) Notifies Tech Maintenance to troubleshoot and repair (as time permits).
(For OP AP-5, "Malfunction of Eagle 21 Protection or Control Channel") if entered, else N/A		
	SRO/ATC	• (1) Confirms that Makeup Controller was NOT controlling properly in Auto and has been taken to manual (CC2). ○ Refers to Attachment 5.2, "Process Control System Racks", for indications and controls affected.
	SRO/BOP	• (2) Determines that the failure is not Eagle-21 related (PK06-01 and PK06-03 are OFF).
	SRO/ATC	• (3) Determines failure is not associated with a ΔT channel (VB2). • (4) Determines Steam Dump valves are controlling properly.
	SRO	• (5) Contacts I&C to investigate. • Reads caution regarding Eagle 21 design feature and notes it does not apply. • (6) Ensures affected channel is removed from service prior to performing maintenance. • (7) Uses Attachments 5.1 and 5.2 to determine affected indicators and evaluate TS/ECGs. Determines no TS impact.
Proceed to the next event once Make-up control system in STOP, per the lead examiner.		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 3 **Page** 5 **of** 16

Event Description: **70 gpm RCS Leak on Loop 2**

Time	Position	Applicant's Actions or Behavior
	ALL	Diagnoses RCS leak from one or more of the following: • Drain and/or Sump high level alarms (PK15-01) • Pzr level lowering (PPC, CC2 recorder, VB2 meters) • Charging flow demand and/or low level deviation alarms (PK05-21) • Containment parameters slowly rising (temp, press) (PPC, VB1 recorder, PAMS panels)
Note: Leak starts instantaneously at 70 gpm. The crew may raise charging by opening FCV-128 and adjusting HCV-142 (CC2) in order to maintain pressurizer level prior to entering OP AP-1, "Excess Reactor Coolant System Leakage".		
	SRO	Enters OP AP-1, "Excess Reactor Coolant System Leakage".
(OP AP-1, "Excess Reactor Coolant System Leakage")		

	SRO/ATC	• (1.a) Determines pressurizer level and charging flow are NOT normal.
		  ○ Charging flow is elevated and pressurizer level is slowly lowering (CC2).
		• (1.a) Adjusts charging and seal flow to maintain pressurizer level.
		  ○ May adjust seal flows using HCV-142 (CC2) to maintain 8-13 gpm.
		  ○ May raise charging in manual using master level controller (HC-459D)(CC2) or flow controller (FCV-128)(CC2).

Note: Monitoring *Pressurizer level and charging flow - NORMAL* is a Continuous Action. Associated RNO steps are performed when crew reports applicable conditions exist (i.e. unable to maintain pressurizer level).		
	SRO/ATC	• (1.a) Determines pressurizer level is still lowering (Continuous Action to Monitor).
	SRO/BOP	• (1.a.1 RNO) Starts second charging pump (VB2, Lower middle skirt).

	SRO/ATC	• (1.a.2 RNO) Checks for continuing decrease in pressurizer level:
		  ○ Readjusts charging and seal flow (CC1).
		  ○ Determines pressurizer level has stabilized (PPC, VB2, CC2).

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 3 **Page** 6 **of** 16

Event Description: **70 gpm RCS Leak on Loop 2 (continued)**

Time	Position	Applicant's Actions or Behavior
(OP AP-1, "Excessive Reactor Coolant System Leakage", continued)		

	SRO/ATC	• (2) Checks RCS pressure greater than 2210 psig and stable (VB2) (≈ 2220-2250 psig).
		• (3) Determines RCS Makeup can keep up with leak.
		  ○ Makeup Control is in AUTO (CC2).
		  ○ VCT Level is stable (PPC, VB2 RCDR-4 just below DRPI).

Note: Remainder of procedure focuses on identifying the actual leak location and is not part of the scenario design. The procedure does not direct review of Tech Specs until after the leak location has been identified and may need to be addressed as a follow up question.		
	SRO	If not already completed, reviews **T.S. 3.4.13.A, RCS Operational Leakage – RCS operational LEAKAGE not within limits for reasons other than pressure boundary LEAKAGE or primary to secondary LEAKAGE**. Required actions: Reduce LEAKAGE to within limits within 4 hrs.
Proceed to the next event once Tech Specs are addressed, per Lead Examiner		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 4 **Page** 7 **of** 16

Event Description: **Seismically Induced Full Load Rejection**

Time	Position	Applicant's Actions or Behavior
Note: Seismic event initiates load rejection; it is not intended that the crew respond in detail to the earthquake.		
	ALL	Crew Diagnoses Earthquake from the following: • Physical shaking of room • PK15-24, "Seismic Instr System" Crew Diagnoses load rejection based on the following: • Generator load dropping • Generator output breakers open. • Steam Dumps activated • Rods stepping in
	SRO	Implements OP AP-2, "Full Load Rejection".
(OP AP-2, "Full Load Rejection")		
	SRO	Reads CAUTION regarding need for manual trip if deliberate operator action to stabilize the plant ON LINE is unlikely.
	SRO/ATC	• (1) Verifies that control rods are inserting properly in AUTO (CC1). • (2) Verifies proper operation of steam dumps, Tave trending to Tref (VB3, red/green indicator lights; Tave/Tref from CC1 recorder/PPC).

	SRO/BOP	• (3) Checks MFP suction adequate:
		  ○ (3.a) Notes standby Condensate/booster pump set did not autostart and manually starts pump set (VB3, lower, center).
		  ○ (3.b) Determines MFP suction is NOT adequate (PPC, VB3 meter).
		  ▪ MFP suction should recover after standby Condensate/booster pump is started
		• (4) Checks DFWCS in AUTO and controlling S/G levels (CC3 MFW HMI, VB3, PPC):
		  ○ (4.a) Determines MFW control and bypass valves in have failed to manual.
		  ○ (4.a RNO) Directs Reactor Trip.

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 5,7 **Page** 8 **of** 16

Event Description: **Manual Reactor Trip**

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Reactor Trip or Safety Injection")		
	SRO/ATC	• (1) Verifies reactor trip (trip bkrs open, rods on bottom, NIs decreasing) (VB2, CC1). • (2) Verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps).
	SRO/BOP	• (3) Checks vital 4kV bus status (VB4, white lights on mimic buses). ○ Reports all vital 4kV buses de-energized.
	SRO	• Directs Transition to ECA-0.0, "Loss of All Vital AC Power".
(ECA-0.0, "Loss of All Vital AC Power")		
	SRO/ATC	• (1) Re-verifies reactor trip; trip bkrs open (VB2 upper left), rods on bottom (VB2 upper left DRPI panel), NIs decreasing (CC1 left). • (2) Re-verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps).
	SRO	Reads notes regarding CSF Status Trees being monitored for INFO only and need for radios.

	SRO/ATC	• (3) Performs RCS isolation steps:
		  ○ (3a) Ensures letdown isolated (VB2):
		  ▪ Verifies 8149C closed.
		  ▪ May close LCV-459/460.
		  ○ (3b) Checks Pzr PORVs closed (VB2).
		  ○ (3c) Checks Excess Letdown isolated (8166/8167, VB2 lower far right).
		  ○ (3d) Ensures NSSS sample valves closed (VB1 lower left):
		  ▪ Closes NSSS Pressurizer Liquid Sample Isolation Valves (9355A/B).
		  ▪ Closes NSSS RCS Sample Isolation Valves (9356A/B).

(continued on next page)

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 6,7 **Page** 9 **of** 16

Event Description: Loss of All A/C Power

Time	Position	Applicant's Actions or Behavior
(ECA-0.0, "Loss of All Vital AC Power", continued)		
Note: Once started, TDAFW will require stationing of local operators to control the TDAFP LCVs.		
	SRO/BOP	• (4) Verifies AFW status. o Checks AFW flow is not > 435 gpm (VB3 upper center meters, SPDS). o Starts TDAFW pump by opening FCV-95 (VB4).
Note: Shift Foreman may authorize an attempted reset of the shutdown relay and DG start for D/G 1-3 or will dispatch field operators to walk down the diesel prior to attempting restoration. D/G 1-3 will not reset.		
	SRO/BOP	• (5) Attempts to restore power to any vital bus. o (5.a) Attempts to start D/Gs. ▪ Depresses D/G Shutdown Relay & Alarm Reset for D/G 1-3 (yellow lamicoid, just below associated diesel tachometer, VB4). ▪ Notes PK18-15 does not clear (D/G 1-3). o (5.a) Dispatches field operators to attempt local start of D/G 1-3.
Note: If the crew enquires about grid status, GCC reports 230kV has experienced significant damage. 500kV is available. Crew may also determine 500kV is available by checking Sync voltage on CC3.		
	SRO/BOP	o (5.b RNO) Implements Appendix DD, "Backfeed from 500KV System" (**see page 15**).
Note: The Shift Foreman will continue on through ECA-0.0, emphasizing step 6 (continuous action to check for any 4kV vital bus energized), while Appendix DD is implemented to restore power. Once 4kV power is restored, crew will exit ECA-0.0 and enter ECA-0.2, "Loss of All AC Power With SI Required" (see page 12).		
	SRO/ATC	• (7) Isolates RCP Seal Cooling: o Reads note regarding RCP seal isolation prior to starting a CCP or CCW pump. o (7.a) Directs field operators to close seal injection valves: ▪ CVCS-8382A, Filter 1-2 Outlet. ▪ CVCS-8382B, Filter 1-1 Outlet. ▪ CVCS-8387A, Filter Bypass. o (7.b) Directs field operators to close CVCS-8396A, Seal Return Filter Inlet Isol. o (7.c) Directs field operators to close FCV-357, RCP Therm Bar CCW Return Isol.
		(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 6 **Page** 10 **of** 16

Event Description: **Loss of All A/C Power (continued)**

Time	Position	Applicant's Actions or Behavior
(ECA-0.0, "Loss of All Vital AC Power", continued)		
	SRO/ATC	• (8) Controls Turbine driven AFW flow to limit the cooldown: o (8.a) Checks S/G Level GREATER THAN 15% in at least one intact S/G. o (8.b) Dispatches field operator to throttle LCVs locally. o (8.c) Maintains S/G N/R level between 20%-65%.
	SRO	• Reads caution about resetting SI before loading 4kV loads if necessary. • Reads caution about safety hazard if bus is energized during load stripping.
	SRO/ATC	• (9) Isolates safeguards loads from deenergized vital buses: o Installs control switch interlocks on the following:

4KV Vital Bus F	**4KV Vital Bus G**	**4KV Vital Bus H**
• ASW Pump 1-1	• ASW Pump 1-2	• CCW Pump 1-3
• CCW Pump 1-1	• CCW Pump 1-2	• CS Pump 1-2
• SI Pump 1-1	• CS Pump 1-1	• SI Pump 1-2
• CCP 1-1	• RHR Pump 1-1	• RHR Pump 1-2
• AFW Pump 1-3	• CCP 1-2	• AFW Pump 1-2

o Ensures Standby Select switches are in MANUAL:
- ASW Pump 1-1 and 1-2
- CCW Pump 1-1, 1-2, and 1-3

o Places all CFCU Speed Select switches in LOW AND dispatches operators to open all CFCU breakers.
- CFCU No. 1-1 52-1F-02
- CFCU No. 1-2 52-1F-01
- CFCU No. 1-3 52-1G-01
- CFCU No. 1-4 52-1H-01
- CFCU No. 1-5 52-1G-02

Note: On completion of Appendix DD, Shift Foreman will implement continuous action step 6 and go to step 28.		
	SRO/BOP	• (28) Determines at least one 4kV vital bus is energized.

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 6 **Page** 11 **of** 16

Event Description: **Loss of All A/C Power (continued)**

Time	Position	Applicant's Actions or Behavior
(ECA-0.0, "Loss of All Vital AC Power", continued)		
	SRO/ATC	• (29) Checks S/G pressure: o Maintains pressure using 10% steam dumps.
	SRO/BOP	• Reads CAUTION regarding overloading capacity of power sources. • (30) Ensures following realigned/loaded on energized vital buses: o 480 volt bus – energized. o 125 V DC batteries and associated battery chargers.
	SRO	• Reads NOTE regarding RCP seal cooling. • (31) Identifies ECA-0.2, "Loss of All AC Power With SI Required" as the appropriate recovery procedure.

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 6 **Page** 12 **of** 16

Event Description: **Start Engineered Safeguards Systems**

Time	Position	Applicant's Actions or Behavior
(ECA-0.2, "Loss of All Vital AC With SI Required")		
	SRO	• Reads CAUTION regarding CSF Status Trees being monitored for INFO only prior to the completion of step 11. • Reads NOTE regarding waiting for restoration of multiple buses before continuing on in the procedure.
Note: May use monitor light box test switch to view valve status.		
	SRO/ATC	• (1) Ensures SI RESET (status lights, VB1 and PK08-21 out). • (2) Checks RWST level greater than 33%. (VB1) • (3) Manually aligns SI valves to establish injection alignment: o (3.a) Checks Monitor Light Box A – White lights out (VB1). o (3.b) Checks Monitor Light Box C – White lights out (VB1). o (3.c) Ensures CCP recirc valves, 8105 and 8106 are OPEN. • (4) Checks RCP Thermal Barrier CCW Isolation status: o (4.a) Checks all CCW pumps not running (VB1). o (4.b) Notes/verifies FCV-357 closed per earlier direction (VB1).
	SRO/BOP	• (5) Manually loads Safeguards Equipment on vital 4kV buses F and G: o (5.a) Checks vital 4Kv auto transfer relays reset – blue lights out (VB4).
	SRO/ATC	o (5.b) Ensures ASW pump standby select switches in MANUAL (VB1): ▪ ASW Pump 1-1 ▪ ASW Pump 1-2 o (5.c) Ensures CCW pump standby select switches in MANUAL (VB1): ▪ CCW Pump 1-1 ▪ CCW Pump 1-2 ▪ CCW Pump 1-3 o (5.d) Removes interlocks from ASW pump control switches and manually starts pumps (VB4): ▪ ASW Pump 1-1 ▪ ASW Pump 1-2

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 6 **Page** 13 **of** 16

Event Description: **Start Engineered Safeguards Systems, (continued)**

Time	Position	Applicant's Actions or Behavior
(ECA-0.2, "Loss of All Vital AC Power", continued)		
	SRO/ATC	• (5) Manually loads Safeguards Equipment on vital 4kV buses F and G (cont): o (5.e) Removes interlocks from CCW pump control switches (VB1): ▪ CCW Pump 1-1 ▪ CCW Pump 1-2 ▪ CCW Pump 1-3 (may leave interlock due to 4kV bus H differential)
	SRO/BOP	▪ (5.e.4) Ensures following valve alignments: • (5.e.4.a) Letdown orfice stop valve, 8149A, B, C: CLOSED. • (5.e.4.b) Excess letdown isolation valves, 8166 or 8167: CLOSED. • (5.e.4.c) RCS and PZR sample isolation valves: o 9354A/B CLOSED o 9355A/B CLOSED o 9356A/B CLOSED
Note: May elect to leave RHR Pump shutdown since RCS is above pump shutoff head.		
	SRO/ATC	• (5) Manually loads Safeguards Equipment on vital 4kV buses F and G: • (5.e.5) Manually starts ONE CCW pump. o (5.f) Removes interlocks from RHR pump control switches and manually starts available pump (VB1): ▪ RHR Pump 1-1 ▪ RHR Pump 1-2 (may leave interlock due to 4kV bus H differential) o (5.g) Removes interlocks from SI pump control switches and manually starts available pump (VB1): ▪ SI Pump 1-1 ▪ SI Pump 1-2 (may leave interlock due to 4kV bus H differential)

(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 6 **Page** 14 **of** 16

Event Description: **ECA-0.2, "Loss of All AC Power With SI Required", (continued)**

Time	Position	Applicant's Actions or Behavior
(ECA-0.2, "Loss of All Vital AC Power", continued)		
	SRO/ATC	o (5.h.1-5) Ensures all CFCUs selected to LOW speed and breakers closed. o (5.h.6) Manually starts CFCUs: ▪ CFCU 1-1 ▪ CFCU 1-2 ▪ CFCU 1-3 ▪ CFCU 1-4 (may leave interlock due to 4kV bus H differential) ▪ CFCU 1-5 • (6) Checks if ECCS CCPs should be started: o (6.a) Checks all ECCS CCPs STOPPED (VB2). o (6.b) Notes seal injection valves CVCS-8382A, 8382B, and 8387A reported CLOSED by field operators. o (6.c.1-2) Removes interlocks from ECCS charging pump control switches. o **(6.c.3) Manually starts one available pump: (S4CT-2)**** ▪ **CCP 1-1 Or CCP 1-2** ****(Critical Task) (S4CT-2) Establish flow from at least one high head injection pump prior to transition out of ECA-0.2.**
The scenario may be terminated once Safety Injection flow is verified.		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 6 **Page** 15 **of** 16

Event Description: **Loss of All A/C Power (continued) – Appendix DD, "Backfeed from 500KV System"**

<table>
<tr><th>Time</th><th>Position</th><th>Applicant's Actions or Behavior</th></tr>
<tr><td></td><td>BOP</td><td>• (1) Determines 500kV power is available:
o Checks Sycn bus volts approximately 120V (uses sync key on CB 532 or 632; CC3).</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td></td><td>BOP</td><td>• (2) Ensures Main Generator Exciter Field Breaker – OPEN (CC3).
• (3) Opens Motor Operated Disconnect (CC3).
• (4) Cuts out Generator Protective Relay Toggle Switches (VB4):
<table>
<tr><td>o 62AMG1/62AMG11, Anti Motoring</td><td>o 21G1, Main Gen Backup</td></tr>
<tr><td>o 3XG1/3XG11, Sequential</td><td>o 46G1, Negative Sequence</td></tr>
<tr><td>o 87YG1, Differential</td><td>o 81G1/T3, UF-55HZ</td></tr>
<tr><td>o 51RU, Unit Runback Fail Trip</td><td>o 38G1, Turbine Thrust Bearing Wear</td></tr>
<tr><td>o 94LSL1, Loss of System Load</td><td>o 81G1/T2, UF-57HZ</td></tr>
<tr><td>o 40G1, Loss of Field</td><td>o 81G1/T1, UF-58HZ</td></tr>
<tr><td>o 59G1, Overvoltage</td><td>o OXP2\K3, Over Excitation</td></tr>
<tr><td>o 59NG1, Neutral Running Overvoltage</td><td>o 51E1, Exciter Overcurrent</td></tr>
<tr><td>o 51STU1, Unit S/U Overcurrent</td><td>o 78G1, Main Gen Out of Step</td></tr>
</table></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td></td><td>BOP</td><td>• (5) Directs field operator to cutout the following Generator Protective Relay Switches in the back of Generator Relay Board RG Section 1 (128ft Cable Spreading Room):
o 62GSC3-TCO, Low Flow and Run Back Failure Trip Cutout
o 62GSC4-TCO, Mn Gen Stator Amps Cutout
o ANS2CX-TCO, Stator Cooling Water Low Flow Condct Hi Trip Cutout
o 62GSC5-TCO, Stator Cooling Water Flow Greater than 60 min Trip Cutout</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3">*(continued on next page)*</td></tr>
</table>

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 4 **Event No.:** 6 **Page** 16 **of** 16

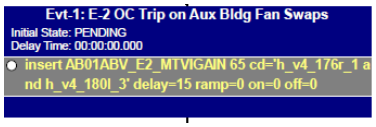
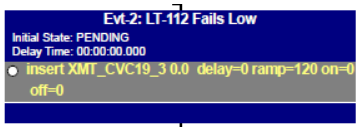
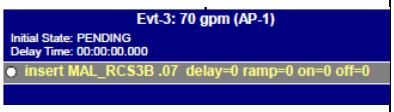
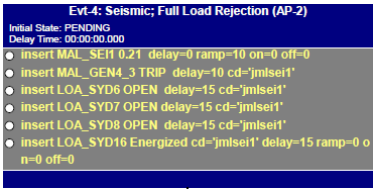
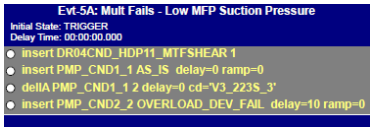
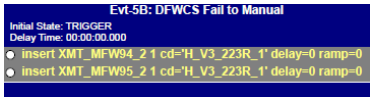
Event Description: **Loss of All A/C Power – Appendix DD, "Backfeed from 500KV System" (continued)(CT)**

Time	Position	Applicant's Actions or Behavior
	BOP	• (6) Ensures the Gen Output Bkrs Reset Pushbutton (VB4) – Blue Light OFF. • (7) Resets Unit Trip Lockout Relays (VB4): o 86G1 o 86G11 • (8) Closes the 500kV output breakers (CC3): o CB 532 o CB 632 • (9) Cuts out 4kV vital bus autotransfer to startup switches (VB4): o Bus G o Bus F • (10) Ensures the 4kV vital bus autotransfer relays are reset (VB4): o Bus G - Blue light off. o Bus F – Blue light off. • (11) Contacts field operators to ensure safe conditions in the switchgear rooms for energizing 4kV vital buses: o Breaker cubicles – doors closed. o Personnel clear of 4kV vital buses. • (12) Ensures 4kV Bus F and G Startup Feeder breakers and D/G Feeder breakers are OPEN.
Note: Board Operator will update the crew prior to energizing the vital buses.		
	BOP	• **(13) Closes 4kV Aux Feeder Breakers on available buses (VB4): (S4CT-1)**** o **Bus G, 52-HG-13** o **Bus F, 52-HF-13** • (14) Reviews OP J-2:V, "Backfeeding the Unit from the 500kV System" for additional actions as time permits. ****(Critical Task) (S4CT-1) Energize at least one vital AC bus from prior to implementation of FLEX strategies (ECA-0.0, step 10 RNO) associated with entry into Extended Loss of AC Power Event (ELAP) conditions.**
The scenario may be terminated once Safety Injection flow is verified.		

** Critical Task

Attachment 1 – Scenario Set-up & Booth Actions

X = manual entry required

	TIME LINE	CONSOLE ENTRY	SYMPTOMS/CUES/DESCRIPTION
X	IC	RESTORE IC-11 (Alt - Use IC-11 and swap ASW trains (1-2 in service w/1-1 shut down; may use Swap2ASWP2.lsn or perform manually)	75%; MOL, C_B – See Turnover Sheet
X	Setup	N/A	D/G 1-2 OOS; Verify ABVS supply fan S-31 and exhaust fan E-1 in service. Check for OOS stickers from LT-112 failure in prior run of scenario.
	The Plant Abnormal Status Board for Surveillance Requirements		STP I-1C – Completed 1 hour ago, due in 7 hours.
	Copies of Procedures, Attachments; Appendixes; Foldout Pages; Annunciator Response Procedures and commonly used forms are in binders and **NOT** Marked up		***OP J-2:V, PK03-17, PK11-21, AP-1, AP-2, AP-5, AP-19, EOP E-0, ECA-0.0, ECA-0.2***
X	0 min	Tools > Simple SBT	Before crew takes the watch. Use Simple SBT, Data Recorder File: sbt_sim.drb, min 960 iterations (30 sec). Critical Task Specific Data Capture: • S4CT1: Vital 4kV Bus Voltage • S4CT2: ECCS Injection Flow
X	0 min	Lesson L181 NRC-S4.lsn	After SFM reports the crew has taken the watch, load session MALS, OVRs, etc. by FILE or MANUALLY (below)
X	Evt-1: E-2 OC Trip during fan swap (approx. 3 min after taking watch per lead examiner)		E-2 trips 15 seconds after S-32 is started. If dispatched to check fan, report smell of burnt insulation in fan room.
X	Evt-2: LT-112 Fails Low (once Evt-1 ECG addressed, per Lead Examiner)		Causes auto make-up.
X	Evt-3: RCS Leak (once Evt -2 auto makeup secured, per Lead Examiner)		Bottom of loop 2 cold leg.
X	Evt-4: Seismically induced Full Load Rejection (once Evt-3 boration complete and TS addressed, per lead examiner)		Full Load Rejection following large seismic event.
X	Evt-5: Low MFP suction pressure and DFWC fails to manual.(Major) (DFW failure triggers off manual start of CBP set)	 	Low MFP Suction caused by Htr 2 drip pump shaft shear, OC trip of CBP 1-2, and standby CBP autostart failure (manual start works) DFWCS fails to manual from PT 508A & B loss of pwr (2 of 3 PCS input control transmitters). Expected response is Manual Rx Trip; Turbine/Rx will auto trip if no action taken by crew.

(con't on next page)

Attachment 1 – Scenario Set-up & Booth Actions (con't)

X = manual entry required

TIME LINE	CONSOLE ENTRY	SYMPTOMS/CUES/DESCRIPTION
Evt-6: Loss of All AC (Major))	**Evt-6: (Major) Loss of ALL AC** Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_EPS4E_2 DIFFERENTIAL cd='fnispr lt 5' delay=5 ramp=0 on=0 off=0 insert MAL_SYD2 0 cd='fnispr lt 5' delay=2 ramp=0 on=0 off=0 insert MAL_DEG1C_2 NO_RESET cd='H_V4_224R_1' delay=0 ramp=0 on=0 off=0	Bus H Differential and loss of Startup both triggered on Rx trip. D/G 1-3 shutdown relay trigger on D/G 1-3 feeder breaker close. When directed to walkdown D/G 1-3, report back no obvious issues identified. Once crew enters ECA-0.0, clear generator fault. When GCC contacted, report 230 kV appears to have sustained significant damage but 500 kV is available.
Evt-7 TDAFW Pump autostart failure (post trip)	**Evt-7: FCV-95 FAILS TO OPEN automatically** Initial State: TRIGGER Delay Time: 00:00:00.000 insert VLV_AFW7_1 1 delay=0 ramp=0 on=0 off=0 delIA VLV_AFW7_1 2 delay=0 cd='v3_219s_3'	FCV-95 fails to open in auto but can be opened manually in the C/R.

Diablo Canyon Power Plant
Operations Shift Log

Unit 1

Unit 1 Days at Power: 111 Days

Operating Mode: 1
Power Level: 75%

Gross Generation: 860 MWe
Net Generation: 810 MWe

Today – Dayshift

Shift Manager Turnover:

PRA RISK STATUS NEXT SHIFT:	Green
GRID STATUS NEXT SHIFT:	Normal
AVERAGE RCS CALCULATED LEAKRATE:	0.01 gpm
CONDENSER INLEAKAGE:	< 0.01 gpd
CONDENSER D/Ps:	NW 5.7 SW 5.7 NE 5.7 SE 5.8 PSID
MAIN GENERATOR H2 USAGE:	325 scfd / 327 scfd 5 day ave
SPENT FUEL POOL:	Temp = 80°F; Time to 200°F = 30 hrs using actual temp (F-ID-7A)

NEW EMERGENT WORK:
- None

SHUTDOWN TECH SPECS / ECGS:
- D/G 1-2 Lube oil heater replacement. TS 3.8.1 Action B – due in 6 days

ECG ACTIONS THAT IF COMPLETION TIME NOT MET ECG 0.3 IS ENTERED:
- None

TURNOVER ITEMS:
- Unit is operating at 75% due to a SCCW Hx Clearance

PRIORITY ITEMS FOR NEXT SHIFT:
- Complete D/G 1-2 return to service and testing following repairs.
- Perform swap of ABVS Supply and Exhaust Fans per OP H-1:II, step 6.1.

ANNUNCIATORS IN ALARM:
- There are no unexpected alarms - all current alarms are consistent with current mode and power level.

Shift Foreman Turnover

TURNOVER ITEMS:

- U-1: maintain 75% - no one in containment.
- U-2: maintain 100%.

REACTIVITY MANAGEMENT:

- Time in core life: _MOL_.
- Power History: Steady State at 75% for past 3 days.
- Boron concentration is _966 ppm_ from a sample taken 2 hours ago.
- Control Rod Height: 194 steps on CBD.
- Diluting the RCS approximately _25_ gallons every 1.5 hrs.
- The last dilution was completed _30 minutes ago.

CONDITIONAL SURVEILLANCES & INCREASED MONITORING:

- Perform STP I-1C for D/G 1-2 OOS every 8 hours.

OTHER ABNORMAL PLANT STATUS

- None

Facility: Diablo Canyon (PWR) **Scenario No:** 5 **Op-Test No:** L181 NRC

Examiners: _____ **Operators:** _____

_____ _____

_____ _____

Initial Conditions: **100% Power, MOL with CCP 1-3 cleared**

Turnover: **At 100% power. CCP 1-3 cleared for routine maintenance. CCP 1-1 I/S.**

Event No	Malf No.	Event Type*	Event Description (See Summary for Narrative Detail)
1	CC01CCW_CCP11_MTFSHEAR 1	**TS, C (BOP, SRO)**	CCW Pp 11 Shaft Shear (**AR PK01-11; TS 3.7.7.A**).
2	MAL_CVC8A 100 ramp=60	**C (ATC, SRO)**	Seal Injection Filter 1-1 plugs causing reduction in charging flow to RCP seals (**AR PK04-22).**
3	MAL_PPL7J 1	**TS, I (BOP, SRO)**	Eagle 21 DFP-1 Halt in Rack 10 (**OP AP-5; TS 3.3.1.E,M; 3.3.2.D, L; 3.4.11**).
4	PK1421_0829 1	**C (ALL)**	Loss of Main Transformer Cooling (**AR PK14-21, AP-25**)
5	MAL_SEI1 0.31 delay=0 ramp=15 MAL_PPL5A; PPL5B BOTH	**M (ALL)**	Large seismic with no automatic or manual reactor trip (ATWS).
6	MAL_RCS3C 10.0 cd='jmlsei1' delay=10 ramp=60	**M (ALL)**	SBLOCA following seismic; ramps in over 60 seconds.
7	MAL_PPL1A FAILURE_TO_INIT MAL_PPL1B FAILURE_TO_INIT	**C (BOP)**	Phase A – Train A and B fail to actuate requiring manual alignment.
8	MAL_SYD2 0 cd='jpplsia' delay=15	**C (ALL)**	Loss of Start-up power 15 seconds after Safety Injection
9	PMP_SIS2_2 OVERLOAD_DEV_FAIL cd='h_v4_218r_1' delay=3 PMP_CVC2_1 AS_IS BKR_EPS15 AS_IS BKR_EPS9_1 OVERCURRENT cd='H_V4_225R_1' MAL_AFW1 TRIP cd='h_v3_109m_1 gt 3000'	**C (ALL)**	Combination of electrical and mechanical failures result in no high or intermediate injection along with degraded secondary side heat removal capabilities.

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

Target Quantitative Attributes (Per Scenario; See Section D.5.d) (from form ES301-4)	Actual Attributes
1. Total malfunctions (5–8) (Events 1,2,3,4,5,6,7,8,9)	9
2. Malfunctions after EOP entry (1-2) (Events 7,8,9)	3
3. Abnormal events (1–4) (Events 1,2,3,4)	4
4. Major transients (1-2) (Event 5,6)	2
5. EOPs entered/requiring substantive actions (1–2) (E-1, FR-C.1)	2
6. EOP contingencies requiring substantive actions (0–2) (FR-C.1)	1
7. Critical tasks (2–3)(See description below)	3

Critical Task	Justification	Reference
(S5CT-1) Trip the Reactor by manually de-energizing 480V Buses 13D and 13E within 90 seconds **of AR PK04-11, Reactor Trip Initiate** coming into alarm.	The safeguards systems that protect the plant during accidents are designed assuming that only decay heat and pump heat are being added to the RCS. Failure to manually trip the reactor causes a challenge to the subcriticality critical safety function beyond that irreparably introduced by the postulated conditions.	• Westinghouse Owner's Group WCAP-17711-NP • Calc G.2 Rev 5 (08151-2169) • OP1.ID2, Time Critical Operator Actions Rev 12, #34.
(S5CT-2) Manually close containment isolation valves such that at least one valve is closed on each Phase A containment penetration before transition out of EOP E-0.	Failure to perform the critical task leads to an unnecessary release of fission products to the auxiliary building, increasing the potential for release to the environment and reducing accessibility to vital equipment within the auxiliary building	• WCAP-17711-NP, CT-11
(S5CT-3) Depressurize Steam Generators to inject SI Accumulators to re-flood the core and clear the Extreme (red path) challenge to the Core Cooling critical status function.	RCS depressurization allows accumulator injection and a temporary restoration of Core Cooling. Continued secondary depressurization allows for low head injection and a stable source of long term Core Cooling. Failure to depressurize the Steam Generators results in the crew having to rely on the lower priority action of sequentially starting RCPs which constitutes a significant reduction of safety margin beyond that irreparably introduced as part of the scenario's design.	• WCAP-17711-NP, CT-39
Per NUREG-1021, Appendix D, if an operator or crew significantly deviates from or fails to follow procedures that affect the maintenance of basic safety functions, those actions may form the basis of a CT identified in the post-scenario review.		

SCENARIO SUMMARY – NRC #5

1. **AR PK01-11, CCW Pp 1-1 Recirc** comes into alarm for FCV-606, CCW Pump 1-1 Recirc Valve, open. Crew identifies low pump amps on VB-1 and dispatches Nuclear Operator to investigate. Field reports no audible flow sound in spite of indications motor is running. CCW Pump 1-3 is started manually and CCW Pump 1-1 shutdown. **TS 3.7.7.A, Vital Component Cooling Water (CCW) System**, is entered for one loop of CCW inoperable (72 hrs).

2. In-service Seal Injection Filter 1-1 plugs, reducing flow to RCP seals and bringing in **AR PK04-22, RCP Seal Inj Fltr Delta-P Hi**. Reactor Operators verify CCP seal cooling is still being maintained by CCW and ATC operator throttles RCP seal injection hand control valve, HCV-142, as needed to maintain pressurizer level. Shift Foreman establishes bands for pressurizer level and confirms field operators have been dispatched to swap seal injection filters.

3. Eagle 21 experiences a Digital Filter Processor (DFP) halt on rack 10. Associated indicators PI-456, LI-460A, FI-415, FI-425, FI-435, FI-445 (VB2), and PR-445, LR-459 (CC2) fail "as-is" as well as control channels for PORV 456 (PT-456) and Pressurizer Level Control (LT-460). Crew responds per OP AP-5, Malfunction of Eagle 21 Protection or Control Channel. Shift Foreman reviews Tech Specs, entering:
   - **TS 3.3.2.D, PC 456D Low Press SI** (72 hrs).
   - **TS 3.3.1.E, PC 456A High Press Trip** (72 hrs).
   - **TS 3.3.1.M, PC 456C Low Press Trip** (72 hrs).
   - **TS 3.3.1.M, LC 460A High Level Trip** (72 hrs).
   - **TS 3.3.1.M, FC-415(425,435,445) RCS Loop 1 (2,3,4) Flow** (72 hrs).
   - **TS 3.3.2.L, PC-456 B, P-11** (1 hr).
   - **TS 3.4.11.B1, B2, & B3 PC-456E, to close & remove power from associated block valve** (1 hr) **and restore to operable** (72 hrs).

4. Crew responds to **AR PK14-21, MAIN TRANSF**. A nuclear operator is dispatched to investigate local alarms and reports back that NO cooling fans or oil pumps are running on the Main Bank C Transformer. Shift Foreman enters **OP AP-25, Rapid Load Reduction or Shutdown** and directs a 50 MW/min power reduction while Maintenance and field Operators attempt to restore transformer cooling.

5. A large earthquake (0.31 g) occurs during the ramp, but the reactor fails to trip automatically. The crew performs the immediate actions of **EOP E-0, Reactor Trip or Safety Injection** and successfully trips the reactor by opening the breakers for 480 V buses 13D and 13E to de-energize the control rod drive mechanism (CRDM) allowing control rods to fully drop into the core **(S5CT-1) Trip the Reactor by manually de-energizing 480V Buses 13D and 13E.**

6. A SBLOCA occurs as a result of the earthquake, but both trains of Phase A fail to actuate. The crew performs manual alignment of Phase A containment isolation valves per **Appendix E, ESF Auto Actions, Secondary and Auxiliaries Status (S5CT-2) Manually close containment isolation valves such that at least one valve is closed on each Phase A containment penetration.**

7. Startup power is lost shortly after Safety Injection initiates and a combination of electrical and mechanical failures result in the loss of both ECCS charging pumps and safety injection pumps. Secondary heat removal is affected as well. The turbine driven AFW pump trips on overspeed and AFW pump 1-3 has no power due to a loss of 4kV bus F.

(continued)

SCENARIO SUMMARY – NRC #5

8. The crew proceeds through E-0, transitioning to **E-1, Loss of Reactor or Secondary Coolant**. A loss of subcooling and lowering RVLIS level eventually results in a magenta path followed quickly by a red path on the core cooling critical safety function. The crew transitions to **FR-C.2, Response to Degraded Core Cooling** briefly, and then on to **FR-C.1, Response to Inadequate Core Cooling.**

   Following the guidance of FR-C.1, the crew performs the final critical task **(S5CT-3) Depressurize Steam Generators to inject SI Accumulators to re-flood the core and clear the Extreme (red path) .**

The scenario is terminated once critical task S5CT-3 is complete.

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 1 **Page** 1 **of** 16

Event Description: **Swap to CCP-1-1 From CCP 1-3 per OP B-1A:V, Section 6.1**

Time	Position	Applicant's Actions or Behavior
	BOP	• Reads NOTE regarding LTOP. • (6.1.1) Notes per Turnover Sheet, RP surveys and postings are complete.
	ATC	• (6.1.2) Places HC-459D in MANUAL (CC2).
	BOP	• (6.1.3) Starts CCP 1-1 (VB2). • (6.1.4) Checks CCP 1-1 amps stable (VB2). • (6.1.5) Shuts down CCP 1-3 (VB2.)
	ATC	• (6.1.6) Checks FI-128 to verify acceptable charging flow with CCP 1-1 in service (CC2). • (6.1.7) Adjusts Pressurizer level to program band using HCV-142 and HC-459D (CC2). • (6.1.8) Adjusts RCP seal flow to 8-13 gpm using HCV-142 and HC-459D (CC2). • (6.1.9) Returns charging to AUTO once Pressurizer level is approximately at reference (CC2). • (6.1.10) N/A
	BOP	• (6.1.11) Records the date and current boron concentration for CCP 1-1 on the Abnormal Status Board.

Proceed to Next Event once seal flow adjusted, per Lead Examiner

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 2 **Page** 2 **of** 16

Event Description: **CCW Pp 11 Shaft Shear**

Time	Position	Applicant's Actions or Behavior
Note: OP AP-11, "Malfunction of Component Cooling Water System" may also be referenced for guidance on starting the standby CCW Pump, however, adequate guidance is provided in the AR PK.		
	ATC	• Observes PK01-11, "CCW PP 1-1 RECIRC" alarming and informs the Shift Foreman
(AR PK01-11, "CCW PP 1-1, RECIRC")		
	SRO	• (2.1) Reads note describing alarm behavior - alarm is enabled 10-30 seconds after pump is started and disabled when the pump is shut down. o Notes alarm is active when CCW Pp 1-1 amps fall below 44 amps.
	BOP	• (2.1.1) Reports pump is running; motor current reading is approx 16 amps (VB1). o May report CCW Header flow lower on all three headers (~ 4000-6000 gpm on each) (VB1).
	SRO/BOP	• Reads note describing local reset of recirc valve. • (2.1.2) Dispatches Nuclear Operator to investigate.
Note: Nuclear Operator in the field will report the following: Recirc valve FCV-606 is open, but there is no sound of flow in the adjacent piping. The pump is running, but sounds unusually high pitched.		
	SRO/BOP	• (2.1.3.a,b) Starts stand-by CCW Pp 1-3 and shuts down CCW Pp 1-1 (if not already done)(VB1). • (2.1.3.c) N/A • May use OP F-2:II, "Component Cooling Water System - Changing Over Pumps and Common Components" for guidance on swapping CCW pumps.
	SRO	• (2.1.3.d) Shift Foreman enters **T.S. 3.7.7.A, Vital Component Cooling Water (CCW) System** for one loop of CCW inoperable. Required action: restore vital loop to operable status (72 hours).
		(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 2 **Page** 3 **of** 16

Event Description: **CCW Pp 11 Shaft Shear (continued)**

Time	Position	Applicant's Actions or Behavior
(OP AP-11, "Malfunction of Component Cooling Water System, Section A – Loss of a CCW Pump/High CCW System Temp") if entered, else N/A.		
Note: Guidance to start the standby CCW Pump is applicable once CCW Pump 1-1 has been shutdown.		
	SRO	• (1) Notes only (1) CCW pump is running, goes to RNO.
	SRO/BOP	• (1 RNO) Starts CCW Pump 1-3: ○ Places STANDBY SELECT switch in MAN (VB1). ○ Takes CCW Pump 1-3 START/STOP switch to START. ○ Goes to Step 4. • (4) Ensures ASW is supplying the in-service CCW Hx: ○ Checks ASW Pp 1-1 in-service with normal amps (VB1).
Proceed to the next event once Tech Spec addressed, per the lead examiner		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 3 **Page** 4 **of** 16

Event Description: **Eagle 21 DFP-1 Halt in Rack 10**

Time	Position	Applicant's Actions or Behavior
	ATC	• Observes PK06-01 (PPS CHANNEL SET FAILURE) and PK06-04 (PPS TROUBLE) alarming and informs the SFM.
	SRO	• Enters **OP AP-5, Malfunction of Eagle-21 Protection or Control Channel**
(OP AP-5, "Malfunction of Eagle-21 Protection or Control Channel")		
	SRO/ATC	• (1) Ensures Primary and Secondary Control Systems Controlling Properly in AUTO.

	SRO	• Reads notes prior to Step 2.
		• (2) Determines extent of Eagle 21 Instrument Failure.
		  ○ Identifies Protection Set 2 affected by PK06-01 & PK06-04 inputs.
		  ○ Dispatches operator to locally identify affected rack per Attachment 5.3.
		  ○ Identifies instruments affected by Rack 10 malfunction Attachment 5.1.
		  ▪ PT-456, Pressurizer Pressure (PI-456 – VB2)(PR-455 - CC2)
		  ▪ LT-460, Pressurizer Level (LI-460A – VB2)(LR-459 – CC2)
		  ▪ FT-415, RCS Loop 1 Flow (FI-415 – VB2)
		  ▪ FT-425, RCS Loop 2 Flow (FI-425– VB2)
		  ▪ FT-435, RCS Loop 3 Flow (FI-435 – VB2)
		  ▪ FT-445, RCS Loop 4 Flow (FI-445 – VB2)

	SRO/ATC	• (3) Rotates TR-411 to channel other than Loop 2 (CC1).
	SRO/BOP	• (4) Checks steam dumps NOT actuated: ○ Steam dumps are closed, UI-500 demand is zero, Dump Arming and Trip Signal lights are all out (VB3).

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 3 **Page** 5 **of** 16

Event Description: **Eagle 21 DFP-1 Halt in Rack 10 (continued)**

Time	Position	Applicant's Actions or Behavior
	SRO	• Reads NOTE regarding consequences of a rack failure. • (5) Notifies I&C to investigate. • (6) Notes the need to ensure affected channels are removed from service prior to maintenance.
	BOP	• (7) Places Out-of-Service stickers on affected indicators.
	SRO	• (8) Shift Foreman review Tech Specs and enters the following: ○ **TS 3.3.2.D, PC 456D Low Press SI (72 hrs)** ○ **TS 3.3.1.E, PC 456A High Press Trip (72 hrs)** ○ **TS 3.3.1.M, PC 456C Low Press Trip (72 hrs)** ○ **TS 3.3.1.M, LC 460A High Level Trip (72 hrs)** ○ **TS 3.3.1.M, FC-415(425,435,445) RCS Loop 1 (2,3,4) Flow (72 hrs)** ○ **TS 3.3.2.L, PC-456B, P-11 (1 hr)** ○ **TS 3.4.11.B1, B2, & B3 PC-456 E, to close & remove power from associated PORV block valve (1 hr) and restore to operable (72 hrs)**
	SRO/BOP	• (8) Directs board operator to implement OP A-4A:III, "Pressurizer – Shutdown and Clearing" to place PCV-456 in close and close block valve 8000C, and dispatches Nuclear Operator to remove power.
Proceed to the next event once Tech Specs addressed, per the lead examiner		

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 4 **Page** 6 **of** 16

Event Description: **Loss of Main Transformer Cooling**

Time	Position	Applicant's Actions or Behavior
	ATC	• Observes PK14-21, "MAIN TRANSF", and informs the Shift Foreman.
(PK14-21, "MAIN TRANSF")		
	SRO/ATC	• (1) Identifies input 829 – "Mn Bk Xfmr Annun and UV" for >90°C AND only 1 fan group running.

	SRO/ATC	• (2.1.1, 2.1.2) Updates crew that AR PK contains the Rx Trip and Turbine Trip criteria.
		• (2.1.3) Dispatches Nuclear Operator to investigate and report any local alarms:
		  ○ Checks blue breaker trip lights OFF in each TQMx-Cx panel (6 panels total).
		  ○ Nuclear Operator will report back there are no local alarms in, but Main Bank 'C' has no fans running and winding temperature is currently 95°C.

	SRO/BOP	• (2.1.4.a,b,c) When Nuclear Operator is directed to manually start the fans, reports fans did not start, and there are no oil pumps running. • (2.1.4.d) Contacts Maintenance to investigate.

	SRO	• (2.1.6) Directs Shift Manager to contact GCC to report alarm is in due to cooling problem on Main Bank 'C' (GCC receives local annunciator alarm when PK14-21 goes into alarm).
		• (2.1.7) Determines alarm condition will not clear.
		  ○ (2.1.7.a) Notes alarm IS due to Main transformer bank high winding temperature and forced cooling cannot be restored.
		  ▪ Notes Reactor must be tripped, and E-0 entered if winding temperature reaches 115°C and forced cooling has not been restored.
		  ▪ Updates crew that Unit will be ramped at 50 MW/min per OP AP-25, "Rapid Load Reduction or Shutdown," until the Unit is off line or forced cooling is restored.

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 4 **Page** 7 **of** 16

Event Description: **Loss of Main Transformer Cooling (continued)**

Time	Position	Applicant's Actions or Behavior
	SRO	Implements OP AP-25, Rapid Load Reduction
(OP AP-25, "Rapid Load Reduction")		
	SRO	Enters OP AP-25, Rapid Load Reduction. • (1.a) Notes runback/programmed ramp is not in progress (may not vocalize, since this ramp is initiated by the crew).
	SRO/BOP	• Commences ramp (guidance is also on lamicoid pegboard on CC3 or Shift Foreman will hand off Step 1 sheet to BOP): ○ (1.b) MW and IMP feedbacks are placed in service (all on Triconex turbine HMI, CC3). ○ (1.c) ≈ 60 MWe load target is entered into Triconex HMI. ○ (1.d) Sets ramp rate to 50 mw/min. ○ (1.e) Pushes GO. ○ (1.f) Determines downpower is greater than 15%. May contact chemistry in advance or wait until 15% power change is complete.
	ATC	• (2) Verifies that control rods are inserting properly in AUTO (CC1). • (3) Turns Pressurizer Backup heaters on (CC1). • (4) Checks charging adequate to prevent flashing in the letdown system; may take manual control to ensure adequate flow (CC2).
	SRO/BOP	• (5) Ensures DFWCS is controlling S/G levels in AUTO (MFW control/bypass valves; MFPs all in AUTO) (CC2) (VB3).

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 4 **Page** 8 **of** 16

Event Description: **Loss of Main Transformer Cooling (continued)**

Time	Position	Applicant's Actions or Behavior
(OP AP-25, "Rapid Load Reduction", continued)		
Note: Major event of scenario is triggered by the boration flow control valve FCV-110A going open following at 45 second delay.		
	SRO/ATC	• (6) Performs boration (the following guidance is on the boration checklist in the reactivity handbook): ○ Presses STOP on M/U Ctrl HMI (CC2). ○ Presses BORATE on HMI. ○ Sets target gallons for boration verifies batch is reset. ○ Sets boric acid flowrate. ○ Presses START, and monitors boration. ○ Once stopped, either returns to AUTO (presses AUTO, then START), or performs additional boration per the Shift Foreman(CC2).
	SRO/BOP	• (7) Checks MFP suction pressure greater than 260 psig (VB3).
	SRO/ATC	• (8) Checks Tavg trending to Tref (PPC, CC1). • (9) Checks Pressurizer pressure and level trending to programmed band (PPC, CC2).
Next event triggered automatically 45 seconds after boration commenced		

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 5 **Page** 9 **of** 16

Event Description: **Large seismic with no automatic or manual reactor trip (ATWS)**

Time	Position	Applicant's Actions or Behavior
	ALL	ATWS is diagnosed from the following: • **PK04-11 REACTOR TRIP INITIATE**
	SRO	Implements EOP E-0, "Reactor Trip or Safety Injection".
(EOP E-0, "Reactor Trip or Safety Injection")		
Note: Attempt to manually trip the reactor may be done prior to entry into EOP E-0 or as part of E-0, step 1 RNO.		
	ALL	Performs immediate actions: • (1) Ensure reactor trip: o Identifies reactor is NOT tripped based on the following: ▪ Rx Trip breakers did NOT open (VB2) ▪ NIs are NOT lowering (CC1) ▪ Rod bottom lights are NOT lit(VB2); moves to step 1 RNO
	ATC/BOP	• (1 RNO) Attempts Manual Reactor Trip o Tries manual reactor trip handles but is unsuccessful (CC1 or VB2). o **Opens 480V breakers 13D and 13E (VB5)(CT)**** **(Critical Task)(S5CT-1) Trip the Reactor by manually de-energizing 480V Buses 13D and 13E within 90 seconds of PK04-11, Reactor Trip Initiate coming into alarm.**
	SRO/ATC	• (1) Verifies reactor trip (trip bkrs open (VB2 upper left), rods on bottom (VB2 upper left DRPI panel), NIs decreasing (CC1 left)).
	SRO/ATC	• (2) Verifies turbine trip (stop valves closed) (CC3 HMI or VB2 RPS indicator lamps).
	SRO/BOP	• (3) Checks vital 4kv busses (VB4, vital busses G/H have white lights on mimic busses; bus F has no power).

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 6 **Page** 10 **of** 16

Event Description: **Small Break LOCA (CT)**

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Reactor Trip or Safety Injection") (continued)		
	SRO/ATC	• (4) Checks if SI actuated (PK08-21 ON, also checks VB1 red train lights and/or train equipment to verify both trains actuated) (VB1 upper right, or CC2 right). o May note loss of pumps due to bus F failure.
	SRO	• (5) Directs App E implemented (usually to BOP)(see page **14**) o Board manipulations are as follows: ▪ **Manually closes Phase A Containment Isolation Valves: (CT S5CT-2)**** ▪ **9356A/B (RCS Sample),** ▪ **9355A/B (PZR Liquid Space Sample) (VB1, far left, lower skirt)** ▪ **8045 and 8029 (PRT Primary Water and N2 Supply valves) (VB2, far right, upper)** ▪ **8110 and 8112** ▪ **8152** ▪ **FCV-253, 254, 255, 256, 258, 260** ▪ **FCV-500, 501** ▪ **FCV-584** ▪ **FCV-633** ▪ **8880** ▪ **Starts CCP 1-2 and SIP 1-2 (S5CT-3)**** ▪ Switches LCV-12 to CONT ONLY (VB3). ▪ Opens Main Feedwater Recirc Valves FCV-53 & 54 (VB3). ▪ Stops all but one CB Pp set. ▪ Throttles RCP seal injection flows to normal if needed (FCV-128, to 8-13 gpm each, CC2). ****(Critical Task)(S5CT-2) Manually close containment isolation valves such that at least one valve is closed on each Phase A containment penetration before transition out of EOP E-0.** ****(Critical Task)(S5CT-3) Start CCP 1-2 and SIP 1-2 pump so as to avoid a severe (Magenta) challenge to the Core Cooling critical status function.**

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 6,8 **Page** 11 **of** 16

Event Description: **Small Break LOCA (continued)**

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Reactor Trip or Safety Injection") (continued)		
	SRO/ATC	• (6) Checks RCS temperature stable or lowering to 547°F. • (7) Checks Pzr PORVs and Pzr Safeties and Spray Valves. ○ Safeties closed (closed); no sonic flow, tailpipe temperature is elevated, but consistent with containment environment (VB2 – upper panel, far right). ○ PORVs closed and block valves 8000A and 8000B are open. (VB2 – upper panel, far right). ▪ 8000C is closed and without power. ▪ 8000A is without power due to loss of bus F. ○ Pzr Sprays closed (green lights on) (CC2).
	SRO/ATC	• (8) Checks RCP trip criteria; ○ Notes RCPs already off due to loss of startup power (VB2).
	SRO/ATC	• (9) Determines S/G are NOT faulted. ○ No S/G lowering in an uncontrolled manner or completely depressurized.
	SRO/ATC	• (10) Determines S/G are NOT ruptured: ○ Checks RE-71/72/73/74 and RE-15R/19 recorders on VB2 (and PPC); (all normal) ○ PK11-06/17/18 (all OFF). ○ No levels rising in an unexpected manner. ○ May request samples.

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 6,8 **Page** 12 **of** 16

Event Description: **Small Break LOCA (continued)**

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Reactor Trip or Safety Injection") (continued)		
	SRO/ALL	• (11) Checks RCS intact (only one valid abnormal reading needed to transition from E-0): ○ (11a) Determines containment pressure is NOT normal (VB1 meters, PPC). ○ (11b) Determines containment sump levels NOT normal (VB1 meters, PAMS). ○ (11c) Determines containment radiation is NOT normal (RM-11, 02, 07 in alarm). ○ (11 RNO) Places 2nd ASW/CCW HX in service (opens FCV-603 and FCV-431, VB1)
	SRO	• Checks Critical Safety Function Status Trees and transitions to EOP E-1, Loss of Reactor or Secondary Coolant
(EOP E-1, "Loss of Reactor or Secondary Coolant")		
	SRO/ATC	• (1) Re-checks RCP trip criteria, noting again pumps not running due to bus loss (VB2).
	SRO/ALL	• (2 & 3) Re-checks for faulted/ruptured S/Gs: ○ Faulted – checks all S/G pressures on VB3 (not uncontrolled drop/depressurized). ○ Ruptured – checks RE-71/72/73/74 and RE-15R/19 recorders on VB2 (and PPC; no upward trends or spikes), and PK11-06/17/18 (alarms not in); requests chemistry to sample S/Gs for activity (as follows, if done): ○ Verifies phase A containment isolation reset (VB1) ○ Opens FCV-584 (air to containment) (VB4, lower left) ○ Opens blowdown isolation valves inside containment (FCV-760, 761, 762, 763) ○ Ensures Chemistry is sampling per CAP AP-1.
	SRO/ALL	• (4) Checks S/G levels: ○ Intact S/Gs NR Level – GREATER THAN 15% [25%] (VB3). ○ Controls feedflow to maintain NR S/G Level between 20% and 65%. ○ Notes only able to feed S/Gs 1-1 and 1-2 due to equipment failures.

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** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 6 **Page** 13 **of** 16

Event Description: **Small Break LOCA (continued)**

Time	Position	Applicant's Actions or Behavior
(EOP E-1, "Loss of Reactor or Secondary Coolant") (continued)		
	SRO/ATC	• (5) Checks PORVs closed; block valves 8000A and 8000B are open (VB2 – upper panel, far right). May restore power to 8000C (5.a RNO) ○ 8000A is without power due to bus loss. ○ 8000C is closed and without power.
	SRO/ATC	• (6) Determines Containment Spray did not actuate and is not required. • (7) Determines ECCS flow should NOT be reduced. ○ (a) RCS subcooling is less than 20°F (SCMM YI-31, lower center VB2).
	SRO/ATC	• Reads CAUTION regarding running RHR pump with cooling to associated heat exchanger. • (8) Determines RHR pump may be stopped: ○ (a) Pressure is greater than 300 psig and slowly lowering. Goes to step (9) per RNO. • (9) Notes RCS Pressure is lowering and continues to step (10).
	SRO/ATC	• (10) Checks if Diesel Generators should be stopped ○ Notes D/G powering buses G/H.
	SRO/ALL	• (11) Evaluates Plant Status: ○ (a) Verifies cold leg recirculation capability – notes power available to both RHR pumps. ○ (b) Checks Aux building radiation monitor – all are Normal. ○ (c) Checks if RHR pumps are on recirculation – they are not. ○ (d) Directs RO to Implement Appendix P, Monitor Light Box Verification (checks ECCS valve lineup). ○ (e) Contacts Chemistry to sample the RCS and place H_2 analyzers in service. ○ (f) Checks Turbine status (oil pumps, coast down, etc). ○ (g) Checks for alarms on Spent Fuel Pool level and temperature.
Once CTs S5CT-2 and S5CT-3 are complete, scenario may be terminated at any point past E-1, step 7.		

Op-Test No.: L181-NRC Scenario No.: 5 Event No.: 7,8 Page 14 of 16

Event Description: (EOP E-0, Appendix E) (continued) (CT)

Time	Position	Applicant's Actions or Behavior
(EOP E-0, Appendix E)		
	BOP	Implements App E (ESF Auto Actions, Secondary and Auxiliaries Status): • (1a) Checks no personnel in Containment (part of turnover; may not voice) • (1b) Announces trip/SI on PA system • (2) Checks main generator – tripped (PK14-01 ON, output bkrs open, and exciter field bkr open, CC3 right side) • (3 & 4) Checks Phase A and Containment Vent Isolation complete (VB1, Monitor Light Box B: red lights ON, white lights ON) ○ Identifies white lights associated with failed open Phase A Containment Isolation Valves. ○ **Manually closes Phase A Containment Isolation Valves: (CT)**** 1. **9356A/B (RCS Sample),** 2. **9355A/B (PZR Liquid Space Sample) (VB1, far left, lower skirt)** 3. **8045 and 8029 (PRT Primary Water and N2 Supply valves) (VB2, far right, upper)** 4. **8110 and 8112** 5. **8152** 6. **FCV-253, 254, 255, 256, 258, 260** 7. **FCV-500, 501** 8. **FCV-584** 9. **FCV-633** 10. **8880** ****(Critical Task)(S5CT-2) Manually close containment isolation valves such that at least one valve is closed on each Phase A containment penetration before transition out of EOP E-0.**

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** Critical Task

Op-Test No.: L181-NRC Scenario No.: 5 Event No.: 7,8 Page 15 of 16

Event Description: (EOP E-0, Appendix E)(continued) (CT)

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Appendix E", continued)		
	BOP	• (5) Verifies ESF (SI) actuation complete (SI Portion of Monitor Light Box C: red light ON, white lights - some ON); ○ Identifies white lights associated with ECCS pump failed autostarts and Bus F) ○ **Starts CCP 1-2 and SIP 1-2 (CT)**** ****(S5CT-3) Start CCP 1-2 and SIP 1-2 so as to avoid a severe (Magenta) challenge to the Core Cooling critical status function.**
	BOP	• (6) Verifies Feedwater isolation complete (F.W. Isolation and S.G. Level Portions of Monitor Light Box C: red lights ON, white lights ON (VB1). ○ Determines all failures are related to loss of 4kV Bus F. • (7) Checks containment spray, Phase B – NOT required (Contmt Isol, Phase B portion of Monitor Light Box D: red lights are OFF); may also note containment pressure, while elevated, is well below actuation setpoint) • (8) Checks Main Steamline Isolate complete (Main Steam Isolation portion of Monitor Light Box D: red light OFF, white light, some ON)
	BOP	• (9) Checks AFW status (AFW Pp 1-2 running, AFW Pp 1-3 lost from bus F) ○ Verifies either min of 435 gpm flow (VB3 center) or S/G level > 15% (VB3 center) ○ Notes only able to feed S/Gs 1-1 and 1-2 due to equipment failures.
		(continued on next page)

** Critical Task

Op-Test No.: L181-NRC **Scenario No.:** 5 **Event No.:** 7,8 **Page** 16 **of** 16

Event Description: **(EOP E-0, Appendix E) (continued)**

Time	Position	Applicant's Actions or Behavior
(EOP E-0, "Appendix E", continued)		
	BOP	• (10) Checks ECCS flows (charging injection (VB2 upper panel left), SI, RHR (both on VB1 upper panel); o Identifies injection flow from both CCP 1-2 and SIP 1-2. o Determines RHR pumps are running in recirc; RCS pressure currently above pump shutoff head. (VB1, middle center skirt) • (11) Reports ESF and AFW status to the Shift Foreman (Shift Foreman may direct operator to continue with Appendix E, or redirect to higher priority tasks)
	BOP	• (12) Checks excess letdown – not in service (8166/8167 closed); • (13) Checks secondary systems (MFPs tripped (VB2, green lights ON) o Selects FCV-53/54 to recirc. o Stops all but one CB Pp set. o Takes LCV-12 control switch to CONT ONLY.
	BOP	• (14) Checks proper operation of Aux Bldg and Control Rm vent systems (vent status light panel white lights)(VB4). o Places both Unit 1 VENT TRAIN 1 BUS F and H MODE SELECT Switches to Mode-3 (VB4). • (15) Verifies available DGs running normally (freq (60), volts (120), speed (900))(VB4). • (16) Verifies vital batteries supplied by chargers (charger and bus volts)(VB5). • (17) Verifies MSRs reset (Triconex HMI)(CC3). • (18) Throttles RCP seal injection flows to normal if needed (FCV-128, to 8-13 gpm each, CC2). • (19) Checks PK11-04 NOT IN (SFP alarm). • (20) Notifies Shift Foreman of completion.

(continued on next page)

Attachment 1 – Scenario Set-up & Booth Actions

X = manual entry required

	TIME LINE	CONSOLE ENTRY	SYMPTOMS/CUES/DESCRIPTION
X	IC	RESTORE IC-10	100%; MOL, C_B – See Turnover Sheet
X	Setup	N/A	PT-403 OOS
	The Plant Abnormal Status Board for Surveillance Requirements		Ensure Abnormal Status board reflects initial setup prior to pump swap.
	Copies of Procedures, Attachments; Appendixes; Foldout Pages; Annunciator Response Procedures and commonly used forms are in binders and **NOT** Marked up		***OP B-IA:V, AR PK01-11, PK14-21, OP AP-5, AP-11, AP-25, EOP E-0, E-1***
X	0 min	Tools > Simple SBT	Before crew takes the watch. Use Simple SBT, Data Recorder File: sbt_sim.drb, min 960 iterations (30 sec). Critical Task Specific Data Capture: • S5CT1: 13D & E position • S5CT2: Phase A valve positions (see pg 13 for listing). • S5CT3: ECCS pump discharge pressure and amps; Charging Injection Flow FI-917, and SI Flow FI-918 and FI-922
X	0 min	Lesson L181 NRC-S5.lsn	After SFM reports the crew has taken the watch, load session MALS, OVRs, etc. by FILE or MANUALLY (below)
X	Evt-1: Normal – Swap Charging Pumps (approx. 3 min after taking watch per lead examiner)	**Evt-1: Swap CCP 1-3 to CCP 1-1** Initial State: PENDING Delay Time: 00:00:00.000	Normal plant evolution to swap from CCP 1-3 to CCP 1-1.
X	Evt-2: CCW 1-1 Shaft Shear (once seal flow is adjusted after pump swap)	**Evt-2: CCW Pp 1-1 Shaft Shear** Initial State: PENDING Delay Time: 00:00:00.000 insert CC02CCW_CCP11_MTFSHEAR 1 delay=0 ramp=0	When dispatched to investigate, report back pump is running, but sounds unusual – high pitched squealing noise. Recirc valve FCV-606 is open, but there is no sound of water flowing in the adjacent pipe.
X	Evt-3: Eagle 21 DFP Halt in Rack 10 (once Evt-2 TS addressed per lead examiner)	**Evt-3: Eagle 21 DFP-1 Halt in Rack 10 (Mult TS)** Initial State: PENDING Delay Time: 00:00:00.000 insert MAL_PPL7J 1 delay=0 ramp=0	When dispatched to rack, provide crew with copy of completed AP-5, Attachment 5.3 (using time compression)
X	Evt-4: Loss of Main Transformer Cooling (once Evt-3 TS addressed)	**Evt-4: Loss of Main X-former Cooling** Initial State: PENDING Delay Time: 00:00:00.000 insert PK1421_0829 1 delay=0 ramp=0	When dispatched to Main Transformer, report back "no local alarms in, but 'C' has no fans running and winding temperature is currently 95°C. If asked about TQMx-Cx panels, report back "the blue breaker trip lights are OFF". When directed to manually start the fans, report "Fans did not start and there are no oil pumps running".
X	Evt-5: (Major) Seismic event - ATWS (triggers 45 seconds after FCV-110A opens)	**Evt-5A: (Major) 0.31 G Seismic 45 sec after boration** Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_SEI1 0.31 cd='h_v2_272r_1' delay=45 ramp=15 **Evt-5B: ATWS (13D/E work)** Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_PPL5A BOTH delay=0 ramp=0 insert MAL_PPL5B BOTH delay=0 ramp=0	Seismic event is automatically triggered 45 seconds after boration flow control valve FCV-110A opens. ATWS: 13D/E will work.

(continued on next page)

Attachment 1 – Scenario Set-up & Booth Actions (con't)

X = manual entry required

TIME LINE	CONSOLE ENTRY	SYMPTOMS/CUES/DESCRIPTION
Evt-6: (Major) SB Loca (10 seconds after seismic)	**Evt-6: SBLOCA 10 sec after seismic** Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_RCS3C 10.0 cd='jmlsei1' delay=10 ramp=60	SM Loca in loop 3 cold leg.
Evt-7: (Phase A, Train A/B failure to init (post trip)	**Evt-7: Phase A - Train A/B Failure** Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_PPL1A FAILURE_TO_INIT delay=0 ramp=0 insert MAL_PPL1B FAILURE_TO_INIT delay=0 ramp=0	Phase A, Train A/B actuation failure.
Evt-8: Combination of mechanical/electrical failures resulting in potential ICC condition (post trip)	**Evt-8A: Loss of S/U15 sec after SI** Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_SYD2 0 cd='jpplsia' delay=15 ramp=0 **Evt-8B: SIP 1-2 OC Fail to Start (Man Avail)** Initial State: TRIGGER Delay Time: 00:00:00.000 insert PMP_SIS2_1 AS_IS delay=0 ramp=0 delIA PMP_SIS2_1 2 delay=0 cd='V1_241S_3' **Evt-8C: CCP 1-2 Fail to Start; Man Avail** Initial State: TRIGGER Delay Time: 00:00:00.000 insert PMP_CVC2_1 AS_IS delay=0 ramp=0 delIA PMP_CVC2_1 2 delay=0 cd='v2_265s_3' **Evt-8D: Bus F S/U Brkr OC; D/G 1-3 Breaker Fails As Is** Initial State: TRIGGER Delay Time: 00:00:00.000 insert BKR_EPS15 AS_IS delay=0 ramp=0 insert BKR_EPS9_1 OVERCURRENT cd='H_V4_225R_1' delay=0 ramp=0 **Evt-8E: TDAFW Overspeed Trip** Initial State: TRIGGER Delay Time: 00:00:00.000 insert MAL_AFW1 TRIP cd='h_v3_109m_1 gt 3000' delay=0 ramp=0	Failures result in no high or intermediate head ECCS flow and only 1 MDAFW pump running. If contacted regarding D/G 1-3, report (after delay) breaker mechanically jammed.

Diablo Canyon Power Plant
Operations Shift Log

Unit 1

Unit 1 Days at Power: 111 Days

Operating Mode: 1
Power Level: 100%

Gross Generation: 1187 MWe
Net Generation: 1137 MWe

Today – Dayshift

Shift Manager Turnover:

PRA RISK STATUS NEXT SHIFT:	Green
GRID STATUS NEXT SHIFT:	Normal
AVERAGE RCS CALCULATED LEAKRATE:	0.01 gpm
CONDENSER INLEAKAGE:	< 0.01 gpd
CONDENSER D/Ps:	NW 5.7 SW 5.7 NE 5.7 SE 5.8 PSID
MAIN GENERATOR H2 USAGE:	325 scfd / 327 scfd 5 day ave
SPENT FUEL POOL:	Temp = 80°F; Time to 200°F = 30 hrs using actual temp (F-ID-7A)

NEW EMERGENT WORK:
- None

SHUTDOWN TECH SPECS / ECGS:
- None

ECG ACTIONS THAT IF COMPLETION TIME NOT MET ECG 0.3 IS ENTERED:
- None

TURNOVER ITEMS:
- PT-403 OOS for Calibration (TS 3.3.3.A); RTS next shift

PRIORITY ITEMS FOR NEXT SHIFT:
- Perform swap from CCP 1-3 to CCP 1-1 per OP B-1A:V, Section 6.1. RP surveys and postings have been completed.

Shift Foreman Turnover

ANNUNCIATORS IN ALARM:

- There are no unexpected alarms - all current alarms are consistent with current mode and power level.

TURNOVER ITEMS:

- U-1: maintain 100% - no one in containment.
- U-2: maintain 100%.

REACTIVITY MANAGEMENT:

- Time in core life: _MOL_.
- Power History: Steady State at 100% for past 3 days.
- Boron concentration is _906 ppm_ from a sample taken 2 hours ago.
- Control Rod Height: 231 steps on CBD.
- Diluting the RCS approximately _25_ gallons every 1.5 hrs.
- The last dilution was completed _30 minutes ago.

CONDITIONAL SURVEILLANCES & INCREASED MONITORING:

- None

OTHER ABNORMAL PLANT STATUS

- None