STATE OF CALIFORNIA
EDMUND G. BROWN JR., *Governor*

PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

May 21, 2013

GA2012-16

Ms. Jane Yura, Vice President
Pacific Gas and Electric Company
Gas Operations – Standards and Policies
6121 Bollinger Canyon Road, Office # 4460A
San Ramon, CA 94583

Subject: Control Room Management Audit

Dear Ms. Yura:

On behalf of the Safety and Enforcement Division (SED), formerly the Consumer Protection and Safety Division, of the California Public Utilities Commission (Commission), Banu Acimis, Aimee Cauguiran, Fred Hanes, Alin Podoreanu; and Pipeline and Hazardous Materials Safety Administration (PHMSA) representatives Byron Coy and Hossein Monfared conducted an audit of Pacific Gas and Electric Company's (PG&E) Control Room Management (CRM) Program from October 29 through November 2, 2012. The audit consisted of an evaluation of PG&E's CRM Operations Manual, CRM Standard and Procedures, and related records. SED also inspected PG&E's Control Room in San Francisco.

A Summary of Inspection Findings (Summary), which contains probable violations and areas of concerns and recommendations identified during SED's audit, is included as an attachment to this letter.

Please provide a written response indicating the measures taken by PG&E to address the probable violations and areas of concerns and recommendations within 30 days from the date of this letter. SED will notify PG&E of the enforcement actions it plans to take in regard to each of the violations found during the audit, pursuant to Commission Resolution ALJ-274, after it has an opportunity to review PG&E's response to the findings included in the Summary.

For any questions related to this matter, please contact Banu Acimis at (916) 928-3826 or by email at banu.acimis@cpuc.ca.gov.

Sincerely,

Mike Robertson

Michael Robertson, Program Manager
Gas Safety and Reliability Branch
Safety and Enforcement Division

Enclosure: Summary of Inspection Findings

cc: Keith Slibsager, PG&E
Larry Deniston, PG&E
Andy Wenzel, PG&E
Alfred Musgrove, PG&E
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Summary of Inspection Findings

Probable Violations

I. Title 49, Code of Federal Regulations (CFR), §192.631 Control room management, Section (d) Fatigue mitigation.

(d) *Fatigue mitigation.* Each operator must implement the following methods to reduce the risk associated with controller fatigue that could inhibit a controller's ability to carry out the roles and responsibilities the operator has defined:

(1) Establish shift lengths and schedule rotations that provide controllers off-duty time sufficient to achieve eight hours of continuous sleep;

(4) Establish a maximum limit on controller hours-of-service, which may provide for an emergency deviation from the maximum limit if necessary for the safe operation of a pipeline facility.

SED reviewed the controllers' schedules and noted that PG&E established shift lengths and schedule rotations that provided its controllers to have off-duty time sufficient to achieve eight hours of continuous sleep and one hour personal time in addition to commute time.

PHMSA FAQ D-03 explains that PHMSA encourages at least ten continuous hours of off-duty time to allow for commutes and other personal activities prior to going to sleep or after waking up. Shorter/longer commute times or the availability of nearby sleep facilities may influence the appropriate amount of off-duty time.

On October 22, 2012, PG&E documented a Gas Control Deviation Report regarding a Gas System Operator (GSO) who has a long commute (typical 3-4 hours round trip) which could prevent the GSO from having eight hours of continuous sleep plus one hour personal time between shifts as required under the Fatigue Management rules.

PHMSA FAQ D-13 states that if additional risks exist as a result of any deviation, the operator would be expected to have or develop a corresponding plan to employ appropriate countermeasures, and demonstrate how those measures offset the additional risks. Frequent occurrence of the same type of deviation should prompt the operator to review policies and procedures to minimize their occurrence.

SED reviewed the deviation report that PG&E documented and discussed the details of the unique situation of one of the controllers whose commute time to and from work is approximately 3-4 hours each day. SED discussed the controller's circumstances and evaluated the potential additional fatigue risks associated with the exception and PG&E's countermeasures to be employed to offset any additional risks for fatigue. SED determined that this is a recurring deviation and the unique situation will continue to exist as long as the controller commutes to PG&E's Control Room located in San Francisco.

SED determined that under the current circumstances, it is not always possible for this controller to have eight hours of continuous sleep plus one hour of personal time due to the controller's long commute to San Francisco. SED found that this type of deviation has been recurring frequently. PG&E must either modify its policies and procedures to minimize the likelihood of occurrence of this deviation or reduce this controller's hours of service (HOS) to decrease the potential for risk of controller fatigue during his shift. As a result, PG&E is in violation of Title 49, CFR, 192.631(d)(1) & 192.631(d)(4).

PG&E representatives explained that PG&E has already planned to relocate its Control Room to San Ramon in 2013 which will resolve this issue by reducing the commute time for this controller.

Please inform SED the effective preventive measures PG&E plans to take in order to deal with this extraordinary case of individual fatigue to prevent any undesirable consequences. Additionally, please inform us when the Control Room is relocated to San Ramon.

II. Title 49, CFR, §192.631 Control room management, Section (j) Compliance and deviations.

(j) *Compliance and deviations.* An operator must maintain for review during inspection:

(1) Records that demonstrate compliance with the requirements of this section; and

(2) Documentation to demonstrate that any deviation from the procedures required by this section was necessary for the safe operation of a pipeline facility.

PG&E's deviation report that was filed on October 22, 2012, explains the deviation from its procedures and presents fatigue mitigation strategies for the GSO with the long commute time. However, the deviation report did not state why the deviation was necessary for safe operation of the pipeline facility. As a result, PG&E is in violation of Title 49, CFR, 192.631(j)(2). PG&E needs to make an explicit statement as to why the deviation was necessary for safe operation as required by Title 49, CFR, 192.631(j)(2).

SED also noted that even though PG&E's standard fatigue mitigation procedures and the special countermeasures adopted in the Deviation Report appear to be adequate to minimize the risk of the controller's fatigue, PG&E is required to ensure that these countermeasures are followed diligently so that risk is not increased.

PG&E must develop a program to assess the effectiveness of the mitigation strategy to keep the GSO from becoming a safety risk. Such a program would include tracking of the daily commute time and the number of positive Fatigue Assessments for the GSO in comparison with co-workers. PG&E must also take further action if the commute time does not routinely provide the minimum eight hours of sleep plus personal time between shifts.

Areas of Concerns and Recommendations

I. Title 49, CFR, §192.631 Control room management, Section (b) Roles and responsibilities.

(b) *Roles and responsibilities.* Each operator must define the roles and responsibilities of a controller during normal, abnormal, and emergency operating conditions. To provide for a controller's prompt and appropriate response to operating conditions, an operator must define each of the following:

(1) A controller's authority and responsibility to make decisions and take actions during normal operations;

(2) A controller's role when an abnormal operating condition is detected, even if the controller is not the first to detect the condition, including the controller's responsibility to take specific actions and to communicate with others.

I-1 SED reviewed PG&E's CRM procedures and determined that the procedures that define roles and responsibilities should include a requirement for controllers to stay at the console to verify that all SCADA commands that have been initiated are fulfilled, and that commands given via verbal communications are acknowledged before leaving the console for any reason. For the command actions that are critical to maintain safety, controllers should remain attentive during this time, and not leave the console prematurely. Additionally, CRM procedures should only allow one controller to take a break at a time.

I-2 The Maximum Allowable Operating Pressure (MAOP) of PG&E's gas pipeline system has been determined by engineering; therefore, GSOs cannot change the MAOP pressure settings. However, if a GSO sends out an invalid pressure command to change pressure settings, the system would not alert the GSO with an error message; therefore, the GSO would not know if the command was accepted or denied. SED noted that PG&E's system should create a warning alert for the GSO that the command is invalid and the system will not accept it in case an invalid pressure command is sent.

II. Title 49, CFR, §192.631 Control room management, Section (c) Provide adequate information.

(c) Provide adequate information. Each operator must provide its controllers with the information, tools, processes and procedures necessary for the controllers to carry out the roles and responsibilities the operator has defined by performing each of the following:

(1) Implement sections 1, 4, 8, 9, 11.1, and 11.3 of API RP 1165 (incorporated by reference, see § 192.7) whenever a SCADA system is added, expanded or replaced, unless the operator demonstrates that certain provisions of sections 1, 4, 8, 9, 11.1, and 11.3 of API RP 1165 are not practical for the SCADA system used;

(2) Conduct a point-to-point verification between SCADA displays and related field equipment when field equipment is added or moved and when other changes that affect pipeline safety are made to field equipment or SCADA displays;

(3) Test and verify an internal communication plan to provide adequate means for manual operation of the pipeline safely, at least once each calendar year, but at intervals not to exceed 15 months;

(4) Test any backup SCADA systems at least once each calendar year, but at intervals not to exceed 15 months; and

(5) Establish and implement procedures for when a different controller assumes responsibility, including the content of information to be exchanged.

II-1 American Petroleum Institute (API) Recommended Practice (RP) 1165 focuses on the design and implementation of displays used for the display, monitoring, and control of information on pipeline SCADA. The primary purpose is to document industry practices that provide guidance to a pipeline company or operator who want to select a new SCADA system, or update or expand an existing SCADA system.

CRM rules require that when an operator adds, expands, or replaces a SCADA system after August 1, 2012, the SCADA system must be in compliance with API RP 1165 immediately upon deployment. If it is not practical for the SCADA system to be in immediate compliance with CRM requirements, operators must document the deviation in accordance with paragraph (j)(2) of the CRM rule. The documentation must demonstrate why immediate compliance with all CRM requirements is not practical and how the deviation is necessary for safe operation. The documentation should also include a justified project timeline that with an indication when full compliance is to be attained.

SED determined that PG&E's procedures are deficient as when its SCADA system should meet the recommendations of API RP 1165. If PG&E determines that it is not practical for it to implement the applicable sections of API RP 1165 when it adds, expands, or replaces its SCADA system, then PG&E must describe in its CRM procedures the criterion used to make such a determination.

II-2 Section192.631(c)(2) requires operators to conduct a point-to-point verification between SCADA displays and related field equipment when field equipment is added or moved and when other changes that affect pipeline safety are made to field equipment or SCADA displays.

PG&E established and implemented the functional checkout procedure (FCO) for point-to-point verification which is utilized for testing, calibration, and adjusting electrical, mechanical, and instrumentation components in order to verify proper operating characteristics.

SED noted that the FCO does not include a step to check all displays for a particular field instrument or equipment. PG&E should include an explicit requirement to the FCO for final verification on the SCADA displays to verify that the field equipment reads the accurate actual line pressure. SED suggests that PG&E also specify the number of displays that a particular process value appears on.

SED also found that for partial simulation, PG&E should establish a procedure to define what type of simulation is applicable for specific instrument and equipment during point-to-point verification.

II-3 PG&E established and implemented an Alternate Gas Control (AGC) Plan to transfer from primary SCADA located in San Francisco to backup SCADA located in Brentwood, and back to primary SCADA. However, the AGC Plan does not have an adequate procedure to explain when it is safe to put the primary SCADA system back on-line.

Additionally, PG&E should have some guidance criteria for the Senior Transmission Coordinator (Sr. TC) to use when deciding to return control back to the primary SCADA

control room located in San Francisco. PG&E notified SED during the audit that it had already updated its AGC Plan to correct this procedural deficiency.

II-4 Section192.631(c)(5) requires operators to establish and implement procedures for when a different controller assumes responsibility, including the content of information to be exchanged.

SED recommends adding a guidance document to PG&E's procedures for conducting a control room specific tailboard meeting after every shift change and to have specific tailboard items such as who conducts the tailboard meeting and the topics covered.

III. Title 49, CFR, §192.631 Control room management, Section (d) Fatigue mitigation.

(d) *Fatigue mitigation.* Each operator must implement the following methods to reduce the risk associated with controller fatigue that could inhibit a controller's ability to carry out the roles and responsibilities the operator has defined:

(1) Establish shift lengths and schedule rotations that provide controllers off-duty time sufficient to achieve eight hours of continuous sleep.

PG&E's procedures do not address how it tracks controllers' HOS. During the audit, PG&E supervisor explained that he would normally use the timesheets to tally the HOS. PG&E should describe the process of tracking controllers' HOS in its CRM procedures.

IV. Title 49, CFR, §192.631 Control room management, Section (e) Alarm management.

(e) *Alarm management.* Each operator using a SCADA system must have a written alarm management plan to provide for effective controller response to alarms. An operator's plan must include provisions to:

(1) Review SCADA safety-related alarm operations using a process that ensures alarms are accurate and support safe pipeline operations;

(2) Identify at least once each calendar month points affecting safety that have been taken off scan in the SCADA host, have had alarms inhibited, generated false alarms, or that have had forced or manual values for periods of time exceeding that required for associated maintenance or operating activities;

(3) Verify the correct safety-related alarm set-point values and alarm descriptions at least once each calendar year, but at intervals not to exceed 15 months;

(4) Review the alarm management plan required by this paragraph at least once each calendar year, but at intervals not exceeding 15 months, to determine the effectiveness of the plan;

(5) Monitor the content and volume of general activity being directed to and required of each controller at least once each calendar year, but at intervals not to exceed 15 months, that will assure controllers have sufficient time to analyze and react to incoming alarms; and

(6) Address deficiencies identified through the implementation of paragraphs (e)(1) through (e)(5) of this section.

PHMSA's FAQ E.17 suggests that controllers should not be able to change set points associated with critical maximum or minimum safety limits. However, operators may choose to allow controllers to change other mid-level alarm set points used for operational purposes.

SED noted that PG&E's GSOs can make set point changes to high-high (HH) and low-low (LL) alarms on its SCADA system. PG&E should not allow its GSOs to change critical maximum and minimum safety limits. PG&E should only give this responsibility and authority to its Sr. TCs or Transmission Coordinators (TC) instead of GSOs so that only the Sr. TCs and TCs are able to make changes to HH and LL alarms set points.

V. Title 49, CFR, §192.631 Control room management, Section (h) Training.

(h) *Training.* Each operator must establish a controller training program and review the training program content to identify potential improvements at least once each calendar year, but at intervals not to exceed 15 months. An operator's program must provide for training each controller to carry out the roles and responsibilities defined by the operator. In addition, the training program must include the following elements:

(1) Responding to abnormal operating conditions likely to occur simultaneously or in sequence;

(2) Use of a computerized simulator or non-computerized (tabletop) method for training controllers to recognize abnormal operating conditions;

(3) Training controllers on their responsibilities for communication under the operator's emergency response procedures;

(4) Training that will provide a controller a working knowledge of the pipeline system, especially during the development of abnormal operating conditions; and

(5) For pipeline operating setups that are periodically, but infrequently used, providing an opportunity for controllers to review relevant procedures in advance of their application.

SED conducted an inspection of training records and procedures and identified the following deficiencies in PG&E's training procedure, TD-4436P-06:

V-1 It does not specify whether controller training on recognizing and responding to abnormal conditions must include lessons learned/critiques of all recent accidents/incidents.

V-2 It does not specify how frequently hypothetical drills will be conducted to incorporate lessons learned from operational experiences.

V-3 It does not specify any timeframe to incorporate any identified improvements in its controller training program as a result of annual reviews.

V-4 It does not include a process to keep track of employees who participated in such computerized and tabletop training simulations. If some employees cannot attend the tabletop training, PG&E should offer the training to those employees on a later date. PG&E should also confirm employees' training completion dates.