LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Diablo Canyon Unit 1	0 5 0 0 0 2 7 5	1 OF 9

TITLE (4)

Technical Specification 6.8.4.g Not Met Due to Inadequate Control of Vendor Information for Plant Vent Noble Gas Radiation Monitors RM-14 and RM-14R

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
05	21	1998	1998	- 0 0 4 -	0 0	06	22	1998	Diablo Canyon Unit 2	0 5 0 0 0 3 2 3

OPERATING MODE (9)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR: (11)		
1	X	10 CFR	50.73(a)(2)(i)(B)
POWER LEVEL (10)		OTHER	
1 0 0	(SPECIFY IN ABSTRACT BELOW AND IN TEXT, NRC FORM 366A)		

LICENSEE CONTACT FOR THIS LER (12)

	TELEPHONE NUMBER	
	AREA CODE	
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MON	DAY	YR
[ ] YES (If yes, complete EXPECTED SUBMISSION DATE)	[X] NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines.) (16)

On May 21, 1998, with Units 1 and 2 in Mode 1 (Power Operation) at 100 percent power, PG&E identified that Technical Specification 6.8.4.g, "Radioactive Effluent Controls Program," had not been met since 1993 for the plant vent noble gas Radiation Monitors (RM) RM-14 and RM-14R. A PG&E system engineer reviewing the Emergency Plan (EP) identified that the calibration procedure did not specify the correct pressure compensation factor. This error could have resulted in delaying the declaration of an Unusual Event for slowly occurring, small radiological release events.

PG&E declared Units 1 and 2 RM-14 and RM-14R inoperable and performed manual sampling and analysis of the plant vent effluent each 12 hours. RM-14 and RM-14R were subsequently reconfigured and functionally tested.

The cause of this event was personnel error by vendor and utility project engineering personnel during the development and installation of the digital radiation monitor system (DRMS) design change, in that there was inadequate control and review of vendor information.

Additional corrective actions include a multi-discipline review of selected DRMS monitor calibration procedures and supporting calculations. Since current design processes and criteria preclude recurrence of similar events, PG&E determined that no additional corrective actions to enhance control of vendor information are necessary.

TEXT

I. Plant Conditions

Units 1 and 2 have operated in various modes and power levels with the condition described.

II. Description of Problem

A. Summary

On May 21, 1998, with Units 1 and 2 in Mode 1 (Power Operation) at 100 percent power, PG&E identified that Technical Specification (TS) 6.8.4.g, "Radioactive Effluent Controls Program," had not been properly implemented since 1993 for the plant vent noble gas radiation monitors (RM)(IL)(MON) RM-14 and RM-14R. A PG&E radiation monitoring system (RMS) engineer reviewing the Emergency Plan (EP) identified that the existing calibration procedure did not specify the correct pressure compensation factor. This error could have resulted in an underestimation of offsite radiation dose as specified in the EP.

PG&E declared Units 1 and 2 RM-14 and RM-14R inoperable and performed manual sampling and analysis of the plant vent effluent each 12 hours until the monitors were reconfigured and functionally tested.

B. Background

TS 6.8.4.g.1) states that limitations are required on the operability of radioactive liquid and gaseous monitoring instrumentation including surveillance requirements and setpoint determination in accordance with the methodology in the offsite dose calculation procedure (ODCP). The ODCP requirements include the plant vent noble gas normal range effluent monitors (RM-14 and RM-14R).

RM-14 and RM-14R provide the primary measurement of noble gas activity of the air exhausted through the plant vent for assessing plant conditions and classification of events in the control room in accordance with the EP, emergency action levels (EALs), and protective action guidelines. The EAL tables in Emergency Plan Implementing Procedure G-1, "Emergency Classification and Emergency Plan Activation," specify that a valid plant vent effluent activity high alarm for RM-14 or RM-14R is a criterion for classification as an Unusual Event (UE).

TEXT

The redundant plant vent noble gas Radiation Monitors, RM-14 and RM-14R, each consist of a microcomputer/electronics assembly, and a beta scintillation detector with a pressurized gas sampling chamber. During normal operations, effluent activity is based on the normal range detector. When effluent activity approaches the upper range limit of the normal range detector, the monitor switches the output indication to the extended range monitor, RM-87. The normal range detector is located within a pressurized gas sampler volume to maximize sensitivity. The extended range detector is located in a nonpressurized gas volume. RM-14 and RM-87 measure plant vent gaseous effluent activity over the range specified in the Final Safety Analysis Report (FSAR) Update, Table 7.5-6, item 67, "Airborne Radioactive Materials Released from Plant."

The monitors readout in engineering units of microcuries per cubic centimeter (uCi/cc) in the control room and at the safety parameter display panel. They also provide output in uncompensated, counts per minute (CPM) to the emergency assessment and response system (EARS), located at the Technical Support Center (TSC) and at the Emergency Operations Facility (EOF).

C. Event Description

Prior to 1992, part of the contract for the new digital radiation monitor system (DRMS) plant vent noble gas monitor RM-14 specified an increase to the sensitivity for low range detectability. To accommodate this specification, the vendor increased the operating sample pressure in the detector gas chamber above the standard operating pressure of 14.7 psia to approximately 27 psia.

In early 1992, the project engineer distributed the vendor factory acceptance test data for the microcomputer/electronics section of RM-14 to all appropriate personnel including the procedure writers and scaling calculation engineer. Section 7.2.5 of the test report provided the process setpoints. The normal pressure setpoint was stated as 14.7 psia.

The factory acceptance test data was used to create the new RM surveillance test procedures (STP) I-39-R14 series. Both the procedure writer and scaling calculation personnel assumed the factory acceptance tests contained all the appropriate microprocessor values for generating the tests and scaling.

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Also in 1992, the vendor completed efficiency testing for isotopic calibration of the pressurized detector section of RM-14. The efficiency test data sheets provided data for various sample volume pressures, including 27 psia. The project engineer submitted the test data to Diablo Canyon Power Plant (DCPP) document control for records storage, but did not distribute this additional test data to the procedure writer, nor the scaling calculation engineer.

During March 1993, the DRMS consisting of RM-14, RM-14R, and RM-87 for the plant vent noble gas; RM-24 and RM-24R for plant vent iodine; and RM-28 and RM-28R for plant vent particulate monitoring for Unit 1 was placed in service.

During April 1993, a similar set of monitors were placed in service for Unit 2.

On May 19, 1998, a PG&E RMS engineer reviewing RM-14 and RM-14R settings in the EP questioned why the CPM values did not correlate with the uCi/cc reading.

On May 21, 1998, after further review by chemistry, emergency planning and instrumentation personnel and discussion with the vendor, it was determined that a correction factor for the pressurized sample chamber had not been correctly applied in the configuration of RM-14 and RM-14R. The effect of this error was that RM-14 and RM-14R readings in the control room were nonconservative by a factor of approximately 2. However, EARS readings were not affected due to the use of CPM or uncompensated data.

On May 21, 1998, at 1230 PDT, Units 1 and 2 RM-14 and RM-14R were declared inoperable and manual sampling and analysis was initiated.

On May 28, 1998, STPs for the plant vent noble gas monitors were revised to incorporate the revised sample pressure parameters.

On May 28, 1998, at 1818 PDT, Unit 1 RM-14 was returned to service with the correct sample pressure parameter entered and the conditional surveillance sampling and analysis action exited.

On June 2, 1998, at 1628 PDT, Unit 2 RM-14 was returned to service with the correct sample pressure parameter entered and the conditional surveillance sampling and analysis action exited.

D. Inoperable Structures, Components, or Systems that Contributed to the Event

None.

E. Dates and Approximate Times for Major Occurrences

1. March 1993: Unit 1 RM-14 and RM-14R were installed.

2. April 1993: Unit 2 RM-14 and RM-14R were installed.

3. May 21, 1998, at 1230 PDT: PG&E declared Units 1 and 2 RM-14 and RM-14R inoperable.

4. May 28, 1998, at 1818 PDT: Unit 1 RM-14 was reconfigured and returned to service.

5. June 2, 1998, at 1628 PDT: Unit 2 RM-14 was reconfigured and returned to service.

F. Other Systems or Secondary Functions Affected

None.

G. Method of Discovery

The condition was discovered by the RMS engineer during an engineering review of the DRMS setpoints.

H. Operator Actions

None.

I. Safety System Responses

None.

III. Cause of the Problem

A. Immediate Cause

Plant vent noble gas radiation monitoring pressure compensation affecting control room indication, alarm setpoints, and the normal range to extended range switchover setpoint were nonconservative due to failure to accurately establish the monitor sample chamber pressure compensation in the STPs.

B. Root Causes

1. Personnel error (cognitive) by the utility DRMS engineering personnel between 1992 to 1993 in that vendor information was not adequately controlled as specified by plant design procedures. PG&E believes that if the efficiency data had been supplied to the procedure and scaling calibration personnel, the inconsistency between the factory acceptance tests and the efficiency tests would have been recognized.

2. Personnel error (presumptive) by the vendor DRMS engineering personnel in that the factory acceptance test data did not incorporate the correct process setpoint. The vendor documented the standard (not site-specific) parameter for the normal pressure of the pressurized sample chamber pressure value.

IV. Analysis of the Event

PG&E determined this error had no effect on the routine plant radiological effluent monitoring program, due to the use of uncompensated CPM data, which is correlated to sample and analysis results for calculating radiological dose.

During the period when RM-14 and 14R were incorrectly configured, no radiological release events occurred that could have been incorrectly classified by the operators due to this problem. An evaluation of the potential effect of the incorrect configuration follows.

The only events that result in primary detection via RM-14 and RM-14R are noble gas releases from Auxiliary Building radiologically active systems, such as tank or system leaks or ruptures. Plant vent iodine and particulate releases are primarily detected via RM-24/24R and RM-28/28R. Most events that could result

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in discharges from the plant vent would result in alarms on other dedicated RMs, such as fuel handling accidents (RM-58 and RM-59), steam generator tube ruptures (RM-15 and RM-15R), or residual heat removal pump seal failures (RM-13). Additionally, system level particulate, iodine, and noble gas RMs are located in unit-common Auxiliary Building areas. These monitors provide local monitoring and warning of a radiological release.

If a release occurred that caused RM-14 or RM-14R to alarm, plant annunciator response procedures direct the operators to notify chemistry and radiation protection personnel, and review Emergency Procedure R-2, "Release of Airborne Radioactive Materials Initial Assessment." In the DCPP EP, a valid high alarm on RM-14 or 14R requires the declaration of an UE. Other RMs would be checked, and surveys of the Auxiliary Building conducted to validate the alarm reading. Using a reading in uCi/cc from RM-14 or RM-14R, plant operators would have calculated a release rate lower than the actual release rate, but above the UE value, resulting in the correct declaration of a UE. The chemistry sampling and verification activities would have provided more accurate and complete release type and rate information.

At the alert or higher levels, the EP is activated and TSC and EOF assume responsibility for dose assessment and protective action recommendations affecting the public. The TSC and EOF personnel rely on the EARS offsite radiological release projection program, which would have provided correct release projections because it uses the uncompensated CPM data provided from RM-14 and RM-14R and other monitors. Therefore, this event would not affect offsite dose projections or protective action recommendations once these facilities were activated in accordance with the EP.

The high alarm setpoint on RM-14 and 14R on each unit corresponds to a dose rate of approximately 1/2 the noble gas site boundary limit [0.029 millirem (mrem) per hour or total effective dose equivalent (TEDE) per unit]. The actual alarm setpoint with RM-14 and RM-14R configured incorrectly corresponds to a dose rate of 0.065 mrem per hour TEDE per unit. The difference between these values would not affect the response to an event or affect the generation of protective action recommendations. In comparison, protective action recommendations for the public are first generated at expected doses of 1000 mrem TEDE.

This condition does not affect the three FSAR Condition IV tank rupture events that could be first detected by upscale readings on plant vent RMs. The design bases accidents for the tank ruptures assume that the entire tank contents is vented through the plant vent within 2 hours. The associated high radiological

activity levels would greatly exceed the RM-14 setpoint, and would be detected on a large number of other plant RMs. PG&E believes that operators would have correctly classified these accidents due to the numerous indications available.

In summary, the effect of the incorrect configuration of RM-14 or RM-14R could have resulted in delaying the declaration of a UE for slowly occurring, small radiological release events. However the difference between the resultant dose rates at the site boundary would not effect protective action recommendations or other actions taken under the EP. There were no radiological releases during this period that were misclassified. There was no effect on the routine radiological monitoring program.

Therefore, this condition did not adversely affect the health and safety of the public.

V. Corrective Actions

A. Immediate Corrective Actions

1. RM-14 and RM-14R STPs were revised and setpoint parameters were reconfigured to specify the proper sample pressure compensation factor.

2. RM-14 and RM-14R were satisfactorily functionally tested with the revised procedure.

3. Plant procedures regarding the design change process were reviewed to ensure that adequate control of vendor information was specified to require, identify, and control important vendor information.

B. Corrective Actions to Prevent Recurrence

A review of critical parameters regarding radionuclide efficiencies and processing for the installed DRMS monitors will be conducted. The review will be performed by chemistry, emergency planning, and instrumentation personnel.

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VI. Additional Information

A. Failed Components

None.

B. Previous LERs on Similar Problems

LER 1-92-031-00, reported an inadequate time response test due to incomplete testing regarding discrete interface relays added late in the design and installation phase to the output of DRMS monitors RM-44A and B. The root causes of this event were inadequate time response test procedures and personnel error (cognitive). Corrective actions included review of procedures that collect data regarding time response tests and issuance of a case study. The corrective actions taken did not prevent this event because RM-14 is not in the time response program and the RM-44 case study was focused on the effect of the add on to PG&E design, not the DRMS equipment.

LER 1-97-003-00, reported an event where a vendor did not provide clear documentation of required periodic testing to assure continued operability of the reactor vessel level indication system. Corrective actions included a review of vendor provided systems installed late in the construction phase of the plant, that may not have had adequate vendor manual information review. This corrective action would not have prevented this event as the DRMS was installed after the period reviewed.