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SUBJECT: Forwards response to Generic Ltr 88-14, "Instrument Air Supply Sys Problems Affecting Safety-Related...."

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James D. Shiffer
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February 21, 1989

PG&E Letter No. DCL-89-041

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Re: Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Response to Generic Letter 88-14, "Instrument Air Supply System Problems Affecting Safety-Related Equipment"

Gentlemen:

In accordance with Generic Letter 88-14, "Instrument Air Supply System Problems Affecting Safety-Related Equipment," dated August 8, 1988, PG&E hereby submits the enclosed report describing PG&E's actions in implementing the request of this generic letter.

Kindly acknowledge receipt of this material on the enclosed copy of this letter and return it in the enclosed addressed envelope.

Subscribed to in San Francisco, California this 21st day of February 1989.

Respectfully submitted,

Pacific Gas and Electric Company

By _____
J. D. Shiffer
Vice President
Nuclear Power Generation

Howard V. Golub
Richard F. Locke
Attorneys for Pacific
Gas and Electric Company

By _____
Richard F. Locke

Subscribed and sworn to before me this 21st day of February 1989

_____
Therese Toliver, Notary Public in and for the City and County of San Francisco, State of California

My commission expires December 25, 1990.

OFFICIAL SEAL
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NOTARY PUBLIC - CALIFORNIA
CITY AND COUNTY OF SAN FRANCISCO
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ENCLOSURE

PG&E RESPONSE TO GENERIC LETTER 88-14

Generic Letter (GL) 88-14, "Instrument Air Supply System Problems Affecting Safety-Related Equipment," dated August 8, 1988, requests that licensees review NUREG-1275, Volume 2, and perform a design and operations verification of the instrument air system. The evaluation that has been performed for the Diablo Canyon Power Plant (DCPP) instrument air system has identified several areas of concern. These concerns are: the existence of contaminants in the instrument air, insufficient procedural guidance, insufficient preventive maintenance, insufficient surveillance testing, degraded air dryer desiccant, marginal back-up system capacity on four safety-related valves, and insufficient air quality monitoring.

PG&E has been developing long term improvements to the instrument air system since April 1988. These improvements were initiated in part by NRC IE Information Notice 87-28, "Air System Problems at U.S. Light Water Reactors," and in part by the plant improvement program. The purpose of the plant improvement program is to perform integrated operations, design, and maintenance review of selected systems. The results of the plant improvement program for the compressed air system will be presented in a report which will be completed in July 1989.

Provided below are PG&E's responses for the items requested to be verified in GL 88-14 and a discussion of the program being used at DCPP for maintaining proper instrument air quality.

Item 1 of GL 88-14

> Verify by test that actual instrument air quality is consistent with the manufacturer's recommendations for individual components served.

Response

PG&E is in the process of obtaining and reviewing the manufacturers' instrument air quality recommendations. This effort will be completed by March 31, 1989. For those recommendations which have been obtained, manufacturers have specified instrument air quality requirements of a maximum allowable particulate size of 5 microns with no oil or moisture present.

Air sampled at DCPP was found to exceed manufacturers' recommendations for particulates. The primary source of this contamination was determined to be from the service air system which is cross-connected to the instrument air system. The service air system consists of carbon steel piping, which has a potential for corrosion, while the instrument air system is composed of copper piping, which is resistent to corrosion. A common set of permanent indoor compressors/dryers/air receivers feed both the instrument air and service air systems. A temporary outdoor air compressor/dryer unit connected to the service air system is occasionally used to supplement service air

requirements. In the past, this temporary outdoor compressor/dryer unit had less stringent moisture and filtration control standards than those for the permanent compressors. These less stringent controls on moisture and filtration contributed to the corrosion in the service air system. During the period of heavy air demand on the instrument air system, the particulates migrated from the service air system into the instrument air system.

In order to prevent a recurrence of this contamination, Operating Procedure, K1-I, "Compressed Air System Make Available and Place in Service," is being revised to require isolation of the service air system from the instrument air system prior to use of the temporary outdoor air compressor. This will prevent contamination of the service air piping. In addition, the moisture and filtration requirements for the temporary compressor/dryer have been upgraded to that of the permanent compressor/dryers.

In order to remove accumulated particulate, the instrument air headers are now being blowndown. As of January 16, 1989, 10 of the 76 major headers have been blowndown. The cleanup process is continuing at the maximum rate of about five headers per week. During the performance of this task, it has been observed that virtually all headers produce rust and scale at the beginning of the blowdown, but eventually produce clean air. After all headers have been cleaned, tests will be performed to determine if additional actions are necessary based on the air quality survey results.

Item 2 of GL 88-14

> Verify that maintenance practices, emergency procedures, and training are adequate to ensure that safety-related equipment will function as intended on loss of instrument air.

Response

As recommended in the November 8, 1988, NUMARC letter on GL 88-14, PG&E is adopting the INPO SOER 88-1, "Instrument Air System Failures," recommendations 1 through 5 to satisfy this item. A summary of the actions is provided below:

Maintenance: Maintenance practices have been improved to assure that clean dry air is provided to safety-related equipment. This will maintain the equipment in a condition to perform their intended function or loss of instrument air. A new preventive maintenance (PM) program has been adopted for the compressors. The DCPP air dryer desiccant was observed to be partially deteriorated from age and the dryer was damaged by rust. The desiccant has been replaced and the dryer modified and tested to assure adequate performance. The new PM program for the dryer includes periodic dew point monitoring of discharge air to determine desiccant condition so it can be trended and replaced when necessary. A temporary dryer has been installed to improve capacity and reliability. DCPP is now in the process of

investigating system upgrades which would include new water-cooled compressors and possibly a vendor-supplied maintenance package. In addition, as described in item 3 below, testing of air-operated valves is performed to ensure they function as intended on loss of instrument air.

Procedures: Procedural changes have been made to assist the operators in responding to a loss of instrument air. Changes were made to reflect system upgrades made in 1988, specifically, inclusion of the continuous dew point monitor, new arrangement of rental air compressors and air dryer, and different filters. The loss or degradation of instrument air pressure response procedure was updated to include a list of valves affected by loss of pressure and the positions to which they are designed to fail. Instrument air operating procedures are also being revised to include actions to be taken when moisture is suspected in the system. Specifically, blowdown locations were identified at low points to remove water.

Training: Operations and maintenance training programs have been revised to incorporate the information described in SOER 88-1. Partial and complete loss of air scenarios are being conducted on the DCPP simulator to increase the awareness of plant operators to various system and plant responses and further to increase their familiarity with using plant drawings to locate leaks. Abnormal Operating Procedure AP-9, "Loss of Air," which includes a description of the components that fail on loss of instrument air, has been included in the Operators requalification program.

Item 3 of GL 88-14

Verify that the design of the entire instrument air system including air or other pnuematic accumulators is in accordance with its intended function, including verification by test that air-operated safety-related components will perform as expected in accordance with all design-basis events, including a loss of the normal instrument air system. This design verification should include an analysis of current air-operated component failure positions to verify that they are correct for assuring required safety functions.

Response

A complete review of the entire instrument air system design, including air or other pneumatic accumulators, is in process and will be complete by the end of 1989.

To meet SOER 88-1 recommendations, the compressed air supply to the instrument air header has a 1 micron afterfilter located downstream of the air receiver

tanks and upstream of all instruments. This filtering process and the use of oil free compressors and continuous dew point monitoring provide for proper air quality to the instrument air system. See Item 4 below for a discussion of how instrument air quality will be monitored in the future.

The Generic Letter notes that the testing referred to in this item may have adverse consequences on plant operation, and hence may be postponed to the next scheduled outage after the submittal of this response. Therefore, in accordance with GL 88-14, the following paragraphs provide a schedule of the tests to be performed during future outages and a discussion of those tests that have been performed.

During the last DCPP Unit 2 refueling outage, the back-up nitrogen supply system to the 10 percent steam dump valves and the pressurizer PORVs, PCV-456 and PCV-455C, was tested. In addition, the air supply check valves to the MSIVs were tested (this practice was initiated by an earlier INPO SOER concerned with MSIV reliability). The successful operation of these components has been demonstrated.

Surveillance test procedures have been approved to test the air supply back-up systems for all air-operated valves required to function to achieve safe shutdown. The test procedure includes testing with a gradual loss of air pressure. The valves included in this test program are in the back-up pneumatic systems for the pressurizer PORVs, PCV-455C and PCV-456; the spray and charging valves, 8145, 8146, 8147, and 8148; the RCS sample isolation valves, 9351A, 9351B, 9356A, and 9356B; and the charging header flow control valve, HCV-142. In addition, surveillance test procedures are being developed for the following valves with backup air: the ASW supply to the CCW heat exchangers, FCV-602 and FCV-603; and the CCW supply to the RHR heat exchangers, FCV-364 and FCV-365. These tests will be performed at the next refueling outage of each unit and at all subsequent refueling outages.

Design verification to confirm that the capacity of the back-up systems is sufficient to support the necessary number of valve operation cycles over the necessary time duration is still in progress as part of the overall design review. When PG&E has completed its design verification, appropriate actions, if required, will be taken to ensure adequate back-up capacity is available to support the necessary number of valve operation cycles.

The current failure positions of air-operated valves were reviewed and all safety-related component failure positions were verified to be correct.

Demonstration that air-operated valves will move to their design failure positions was accomplished after the initial valve installation or after major maintenance. These tests include a modulation of the air pressure; the air pressure at which the valve begins to open or close is recorded and confirmed to be acceptable.

Item 4 of GL 88-14

> Each licensee/applicant should provide a discussion of their program for maintaining proper instrument air quality.

Response

Several features of the PG&E instrument air quality program practices have been described above. These include: the adoption of new preventative maintenance tasks; the revision of operations and maintenance training programs; the revision of procedures; and the preparation of surveillance tests that will be performed each refueling outage. Furthermore, future system improvements are under development as part of the plant improvement program.

In addition, instrument air quality is being monitored in three ways. First, the instrument air moisture content is checked by continuous dew point monitoring. Annunciator window PK-1316 has been changed to alarm on detection of an unacceptabe dew point condition. Second, on a monthly basis, the outlet dew point of each plant dryer will be monitored to evaluate the desiccant condition and efficiency. Third, routine sampling for particulates and oil content will be performed on a six-month frequency initially. Since the oil content is expected to be low (DCPP uses oil free compressors), the frequency of oil sampling may be lessened based on the results of the first year of sampling. As recommended by SOER 88-1, ANSI Standard ISA-7.3 should be met at the exit of the air receivers.