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SUBJECT: Responds to 890217 request for addl info re measuring techniques for irregularly oscillating gauges.

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James D. Shiffer  
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Nuclear Power Generation

March 20, 1989

PG&E Letter No. DCL-89-067



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  
Reply to NRC Letter dated February 17, 1989  
Measurements From Oscillating Gauges

Gentlemen:

An NRC letter dated February 17, 1989, from R. P. Zimmerman to J. D. Shiffer, requested additional information regarding PG&E's measuring techniques for irregularly oscillating gauges. This request was to clarify PG&E's response in DCL-89-012, dated January 19, 1989, to a Notice of Violation issued in Inspection Report Nos. 50-275/88-31 and 50-1323/88-29, dated December 20, 1988. PG&E's response to the NRC letter is provided in the Enclosure.

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

Sincerely,

A handwritten signature in dark ink, appearing to read 'J. D. Shiffer'. The signature is written in a cursive style with some loops and flourishes.

J. D. Shiffer

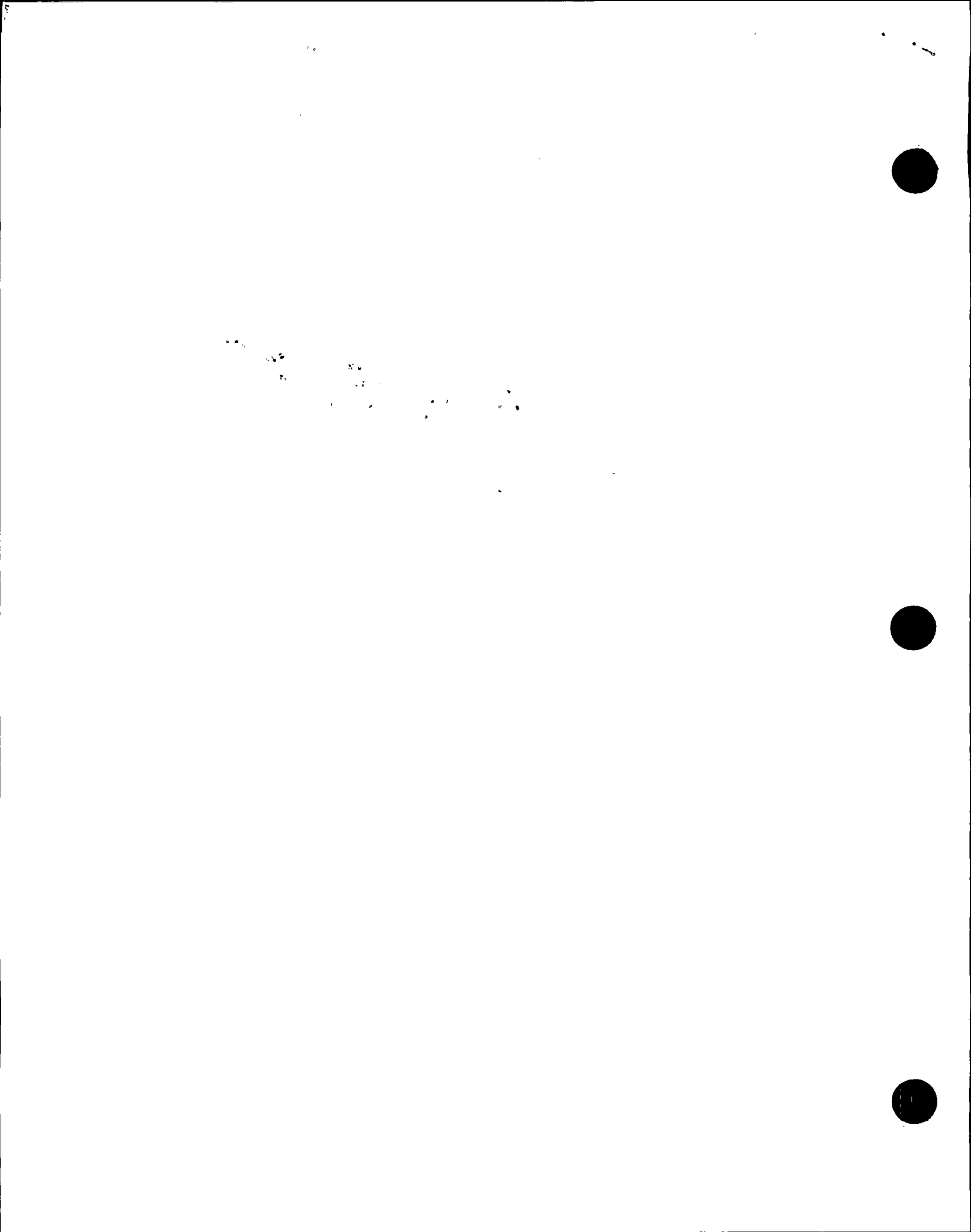
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Enclosure

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## ENCLOSURE

REPLY TO NRC LETTER DATED FEBRUARY 17, 1989  
MEASUREMENTS FROM OSCILLATING GAUGESNRC Request

The NRC letter of February 17, 1989 states in part:

Our review of your response indicates that further clarification is required. Your response indicates that the basis for the average-of-five-readings approach of oscillating gauges was "engineering judgement". The use of such an averaging technique could be appropriate for randomly varying readings, but for erratic readings, such as the gauge in question, this may not be appropriate. Therefore, please provide (1) the statistical accuracy of this measuring technique, and (2) the acceptability of that accuracy for the parameter measured.

PG&E Reply

Based upon the NRC request for further information, PG&E believes that it is useful to review the purpose and intent of these gauge measurements and the DCPD procedures. It is PG&E's intent to provide an appropriate mechanism to provide guidance to personnel reading gauges to ensure compliance with ASME Section XI when an oscillating gauge is encountered. It is PG&E's practice to use properly operating gauges to obtain test data. If a gauge acts erratically, i.e., producing non-uniform random oscillations, the operability of the gauge is considered uncertain and, an engineering evaluation is performed to assess gauge operability.

The following describes the current guidance in AP C-3S3; however, this guidance, as noted later, is being revised to reflect the need for timely engineering evaluations for irregularly oscillating gauges. Administrative Procedure AP C-3S3, "Dealing with Gauge Oscillations During the Performance of ASME Section XI Required Tests," was issued to provide guidance on the use of gauges. Currently, this procedure does not allow use of a gauge which has irregular oscillations greater than 10 percent of full gauge range to obtain test readings. If a gauge oscillates irregularly between greater than 2 percent of midpoint and less than 10 percent of full gauge range, and the gauge is not reading at either end of the gauge scale, then plant personnel are required to use an averaging technique and are also required to document on the surveillance test that such techniques were used and issue an Action Request (plant reporting system) documenting the oscillation. Issuance of the Action Request brings such an occurrence to the attention of DCPD management for evaluation. AP C-3S3 requires that the action request also provide for the performance of an engineering evaluation to determine if the oscillations can be reduced or eliminated through component or system modification. Test personnel are directed not to use a gauge if they judge the gauge's operation to be questionable.

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With respect to AP C-3S3 statistical accuracy, based on guidance in Introductory Statistics, Wonnacott (John Wiley & Sons, 1977), the Central Limit Theorem of statistics shows that although readings from a random or erratically (i.e. irregularly) oscillating gauge may not be represented by a normal distribution, the potential average reading values will form a normalized distribution about the actual gauge reading (the average value of an infinite number of sample points). PG&E's current method of averaging five readings from irregularly oscillating gauges in conjunction with the oscillation limits as specified in AP C-3S3 will result in an average reading within 2 percent of actual with a 63 percent confidence level, or within 4.4 percent with a 95 percent confidence level. Twenty-four readings would be required to obtain a measurement within 2 percent of actual with a 95 percent confidence level. The basis for these determinations are documented in internal PG&E files.

Based on the statistical study PG&E feels that improvements to AP C-3S3 have been identified which will ensure that parameter measurements from gauge readings are acceptable. To ensure that irregularly oscillating gauges used for recording test results on ASME Section XI surveillance tests are closely scrutinized and evaluated, AP C-3S3 will be revised to state that when gauge oscillation is irregular and between greater than 2 percent of the gauge reading and less than 10 percent of the full gauge range, a plant engineering evaluation to determine the cause of the oscillation and its effects on acceptability of the data will be required prior to test completion. The DCPPE Engineering Manager is responsible for making this determination. AP C-3S3 will be revised by April 1, 1989 to incorporate the foregoing changes. Following this revision, training of appropriate personnel will be conducted prior to procedure implementation.

