FEB 25 1974

Pacific Gas and Electric Company
ATTN: Frederick T. Searls
Vice President and General Counsel
77 Beale Street
San Francisco, California 94106

Docket No. 50-275

Gentlemen:

Thank you for your letter dated February 14, 1974 which forwarded a final report pursuant to 10 CFR 50.55(e) regarding apparent discrepancies in welding on the primary loop piping on the Diablo Canyon Unit 1. Your report will be reviewed and evaluated and, should we require additional information concerning this matter, we will contact you.

Your cooperation concerning this matter is appreciated.

Sincerely,

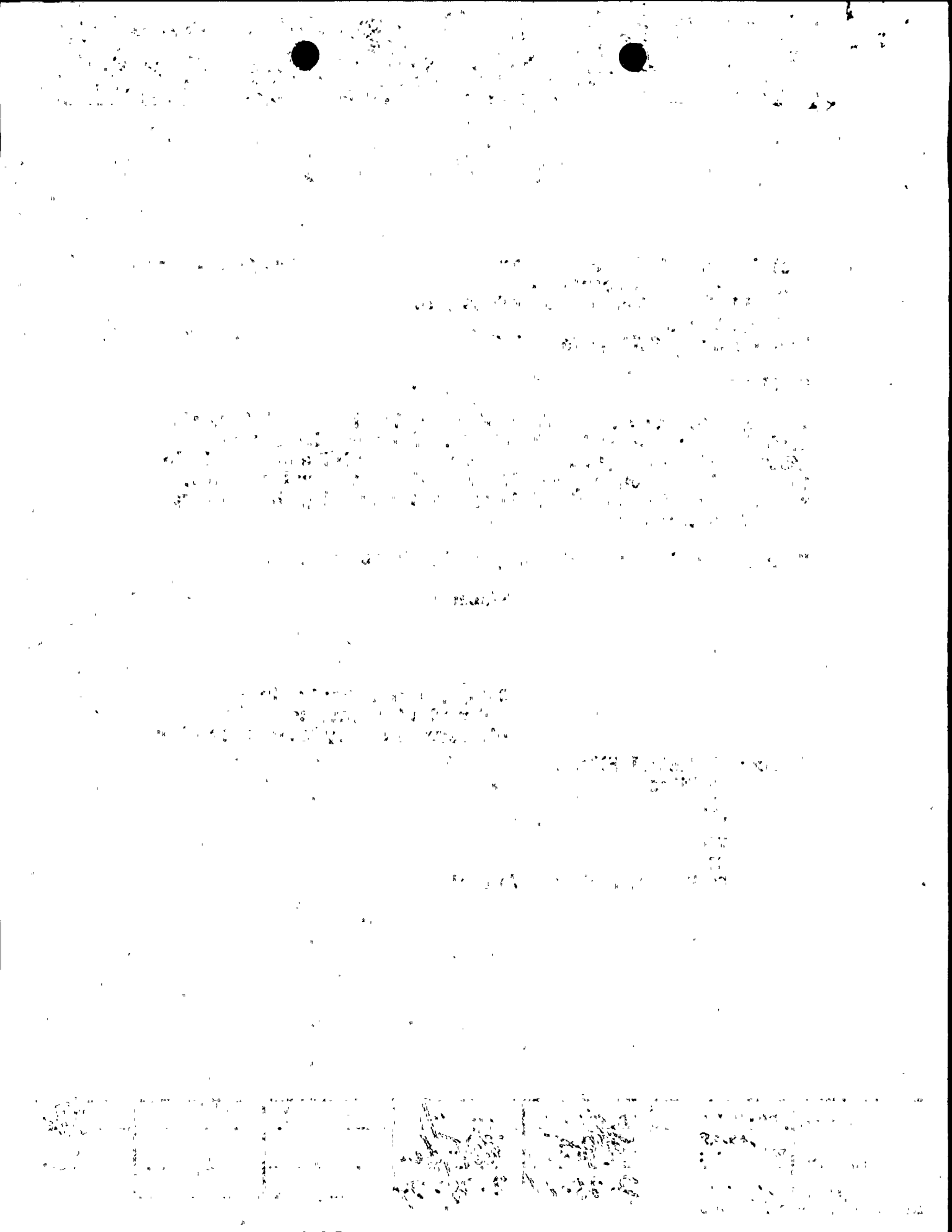
John G. Davis, Deputy Director
for Field Operations
Directorate of Regulatory Operations

bcc: DR Central Files
RO Files
PDR
LPDR
TIC
NSIC
RO:V, R.H.Engelken, w/o encl

MISC

OFFICE ▶	RO:FS/EB	RO:FS/EB.C	RO:DD/FO			
SURNAME ▶	RCPaulus:das	HHolmburg	JGDavis			
DATE ▶	2/25/74	2-25-74	2-25-74			

Form AEC-318 (Rev. 9-53) AECM 0240 GPO e13—1G—81465-1 45-078



PACIFIC GAS AND ELECTRIC COMPANY

PG&E — 77 BEALE STREET • SAN FRANCISCO, CALIFORNIA 94106 • (415) 781-4211

FREDERICK T. SEARLS
VICE PRESIDENT AND GENERAL COUNSEL
JOHN C. MORRISSEY
ASSOCIATE GENERAL COUNSEL
WILLIAM B. KUDER
WILLIAM E. JOHNS
MALCOLM H. FURBUSH
CHARLES T. VAN DEUSEN
MALCOLM A. MACKILLOP
PHILIP A. CRANE, JR.
ASSISTANT GENERAL COUNSEL

February 14, 1974

NOEL KELLY
HENRY J. LAPLANTE
RICHARD A. CLARKE
GILBERT L. HARRICK
EDWARD J. McDANNEY
JOHN B. GIBSON
GLENN WEST, JR.
ARTHUR L. HILLMAN, JR.
CHARLES W. THIBSELL
ROBERT OHLBACH
STANLEY T. SKINNER
DANIEL E. GIBSON
SENIOR COUNSEL

DAN GRAYSON LUBBOCK
J. BRADLEY BUNNIN
BERNARD J. DELLA SANTA
JACK F. FALLIN, JR.
HOWARD V. GOLUB
DONALD L. FREITAS
JAMES C. LOGEDON
JOSEPH B. ENGLERT, JR.
LOUIS F. SCHOFIELD
ROBERT L. GORDON
DENNIS C. SULLIVAN
KATHY GRAHAM
ROBERT L. HARRIS
LINDA B. FRIEDMAN
GERALDINE M. RANDALL
J. PETER BAUMGARTNER
ATTORNEYS

Dr. Donald F. Knuth, Director
Directorate of Regulatory Operations
Office of Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

Re: Docket No. 50-275-OL
Diablo Canyon Unit 1

Dear Dr. Knuth:

In our letter dated October 24, 1973, we provided a preliminary report concerning the circumstances surrounding the apparent discrepancies found in work performed on the Diablo Canyon Unit 1 nuclear steam supply primary loop piping. We have completed our study, and this is our final report.

As we previously reported, PGandE, with assistance from the contractor performing the work, Wismer and Becker, and Westinghouse Electric Corporation embarked on a comprehensive analytical and physical investigative program to evaluate the quality of the welds, both completed and partially completed, of the primary coolant loop piping. This study included an evaluation of any possible detrimental consequences on other welds in which the preferential welding technique had been used.

The concerns resulting from the apparent discrepant welding, which were unresolved at the time of our preliminary report, with conclusions of the investigative efforts thereon are provided below:

A. Concern: The possibility that preferential sequence welding for alignment purposes has introduced unusual stresses in the reactor coolant pipe and/or weld joints.

Response: Weld joints in the as-welded condition will contain internal residual stresses which are considered acceptable as part of the welding process or processes. The technique of welding for alignment purposes has proven itself through experience at similar plants.

In the case at hand, the preferential sequence welding was performed while the equipment on the end of the piping was free to move without restraint in the horizontal plane and vertically upward. The only positive restraint was in the vertical downward direction. The intent of the preferential sequence welding was to maintain the equipment level horizontally. As our records show, the equipment on the end of the piping did not remain level horizontally but rather rotated out of level, thus relieving stresses which might exist if this movement had not occurred.

Under the direction of Westinghouse, a special investigative program was undertaken. Extraordinary sensitive liquid penetrant and radiographic examinations were performed on portions of the weld joints which could have been subjected to unusual stress if the piping had been totally constrained. While typical weld defects were found by this macroscopic examination, no evidence indicative of any detrimental effects attributed to the preferential sequence welding was discovered.

The welding as performed was in accordance with the applicable design, fabrication and installation codes for this work, and the code considers stresses due to welding in its design requirements. On the basis of our investigations, the welding technique was acceptable.

In addition, the primary system weld joints are required to be non-destructively examined after hydrostatic and hot functional testing to ascertain that no failure condition developed due to the combined residual and applied stress effects of these tests.

B. Concern: The possibility of material degradation within weld joints due to uncertainty of heat input rates during welding and the present limited evidence of interpass temperature control during preferential welding.

Response: A review of records for the primary coolant piping reveals that the procedure used for welding, Wismer and Becker Welding Procedure 3500-1, produces welds with acceptable heat inputs. The welding on welds 3-5A and 3-5B was performed according to Wismer and Becker Procedure 3500-1, and differed from other welds made using the procedure only in the welding sequence. Since welding sequence has no effect on heat input, no degradation of weld properties took place due to heat input effects.

We have calculated that the maximum interpass temperature attainable after 65 weld passes, the maximum number of passes on either weld 3-5A or 3-5B on any one day, was 220 degrees F, a temperature well below the maximum specified interpass temperature of 350 degrees F. The calculation was based on temperature measurements made in the field, utilizing six thermocouples, during the welding of similar weld 2-4A

after the resumption of work. For evaluation of the adequacy of our investigative efforts on this subject and the interpretation of conclusions derived, Wismer and Becker retained the advice of an engineering consultant, Jacobs Associates of San Francisco, to review all the collected data and to provide independent judgment. Their report confirmed the validity of our investigation and conclusions. PGandE has approved and implemented changes to Specification 8752 which, with associated drawings, defines the scope of the installation of the primary loop pipe; Wismer and Becker's work procedures have likewise been changed, approved and implemented to provide improved guidelines for accomplishment of work on this system.

Although the welding of joints 3A and 5A deviated from the procedures then in use, the welding techniques employed did not conflict with ASME code technical requirements or those of the engineer, Westinghouse Nuclear Energy Systems, and there was no evidence or indication of detrimental effects from which to conclude that any degradation of material existed because of the preferential sequence welding technique employed. Therefore, welding of the primary coolant loop pipe, recommencing with joint 2-4B, was resumed November 9, 1973. Welding of joint 3-5B was resumed January 31, 1974 and welding of joint 3-5A will resume about February 18, 1974. PGandE Deviation Report No. 182 and Wismer and Becker Non-conformance Report No. 12 document the discrepancy and are available for review by your inspectors at the site.

The circumstances surrounding the unauthorized departure from approved procedures and subsequent documentation thereof has been corrected, and we have utilized this discrepancy as a teaching vehicle in our special training program for on-site field engineering and inspecting personnel to refamiliarize them with the quality assurance requirements of on-site activities. We will continue to monitor the application of field procedures to ensure that our people are informed and that work is in full compliance with applicable quality assurance requirements.

Very truly yours,

F. T. Searls

CC: Mr. R. H. Engelken, Director
Directorate of Regulatory Operations
Region V