UNITED STATES
ATOMIC ENERGY COMMISSION
DIVISION OF COMPLIANCE
REGION I
970 BROAD STREET
NEWARK, NEW JERSEY 07102

E. H. Cane
Maccary

2016453942

September 22, 1970

J. P. O'Reilly, Chief, Reactor Inspection and Enforcement Branch, Division of Compliance, HQ

INQUIRY MEMORANDUM
CONSOLIDATED EDISON COMPANY, INDIAN POINT NO. 2 (IP-2) 247/70-A
PRESSURIZER BASE PLATE QUALITY

As previously reported*, preservice inspections of the pressurizer welds raised questions which initially gave the appearance of laminations in some of the base plate material. Subsequent UT of the pressurizer welds was performed. Messrs. Brown and Madsen visited the IP-2 site on September 8, 1970, to review the UT techniques and results. Pertinent information relating to this subject follows:

1. The preservice inspection of pressurizer welds was conducted for the purpose of obtaining base line data to be used in conjunction with the future in-service inspection. The inspection was performed using the longitudinal technique and from the outside of the pressurizer, a 2.25 MHZ, 1 inch diameter transducer and a 3/8 inch side drilled hole calibration block were employed.

   A reference back reflection of 75% of full screen height was employed. The test results for the upper longitudinal weld** and 10 inches to the side of the weld, indicated a loss of back reflection greater than 20% for about 1/3 of the area surveyed. In addition, some areas showed a 100% loss of back reflection. Westinghouse (W) and Con Ed analyzed the UT technique employed and concluded that the sensitivity would be greater than is required for base plate material, and that additional testing was required.

2. Additional UT was performed using the longitudinal technique, the same 2.25 MHZ transducer, and a 75% reference back reflections from the opposite side of the plate. The data collected is indicated on Attachment No. 2 of this report.

3. Longitudinal UT was performed using a 5 MHZ transducer and a 75% back reflection from the opposite side of the plate. This testing indicated that the depths of the indicated defects, from the test surface, ranged from 1.6 to 2.65 inches and the individual

*CO Report No. 247/70-8, paragraph II. J.
**Attachment No. 1

8111140207 701229
ADOCK 05000247

indications were not continuous. Mr. Dadson indicated that at this point personnel from Westinghouse (W), United States Testing (UST), Southwest Research (SW) and Con Ed concluded that a lamination condition does not exist; however, the indicated condition was suspected to be caused from metallic, or nonmetallic, inclusions in the base plate.

4. Using the longitudinal UT technique and increasing the gain to a maximum, a back reflection in the subject area was attained.

5. The areas where a 100% loss of back reflection was encountered, in the test program included in Item 2 above and illustrated in Attachment No. 2 of this report, were laid out in 1 inch square grids. Each square of the grid was subject to shear wave UT with a 45 and 60 degree angle transducer, and rotation sufficient to assure 100% survey of each area of the transducer. This testing was witnessed by W, UST, SW and Con Ed. This testing produced negative results. Mr. Dadson stated that these findings indicated to personnel from W, UST, SW and Con Ed that there is no change in direction of the individual indications noted in Item 2, above.

6. Additionally, Con Ed indicated that:

   a. Mill certificates indicate a 100 percent UT.

   b. Vendor reports indicate no conditions that were not in accordance with the requirement of ASME Section III.

7. Con Ed's present status on this subject is:

   a. Reports are to be prepared by W, UST, and SW. These reports are to be forwarded to Con Ed.

   b. Con Ed plans to review radiographs of the subject area.

   c. A Con Ed engineering review of the total findings will follow. here now?

8. The main area of concern to Region I, CO are:

   a. The large area where a 100 percent loss of back reflection was encountered.

   b. The near continuous indications in the weldment zone as indicated on Attachment No. 2 of this report.

9. The Region I, CO plan for future review includes:

   a. Evaluation of the radiographs for the subject area.

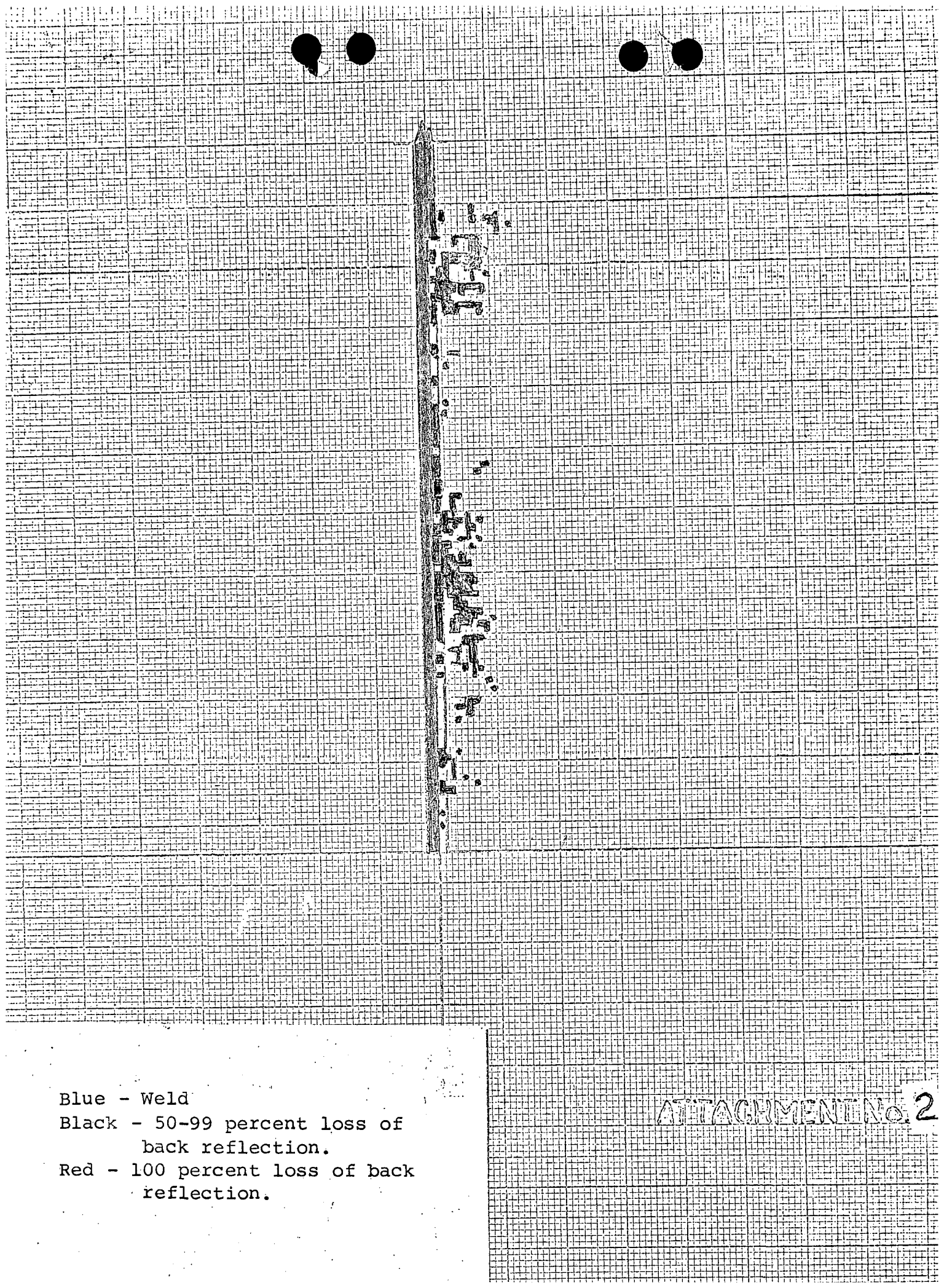
   b. Evaluation of the final Con Ed evaluation packet.

N. C. Moseley
Senior Reactor Inspector

CO:I:GLM

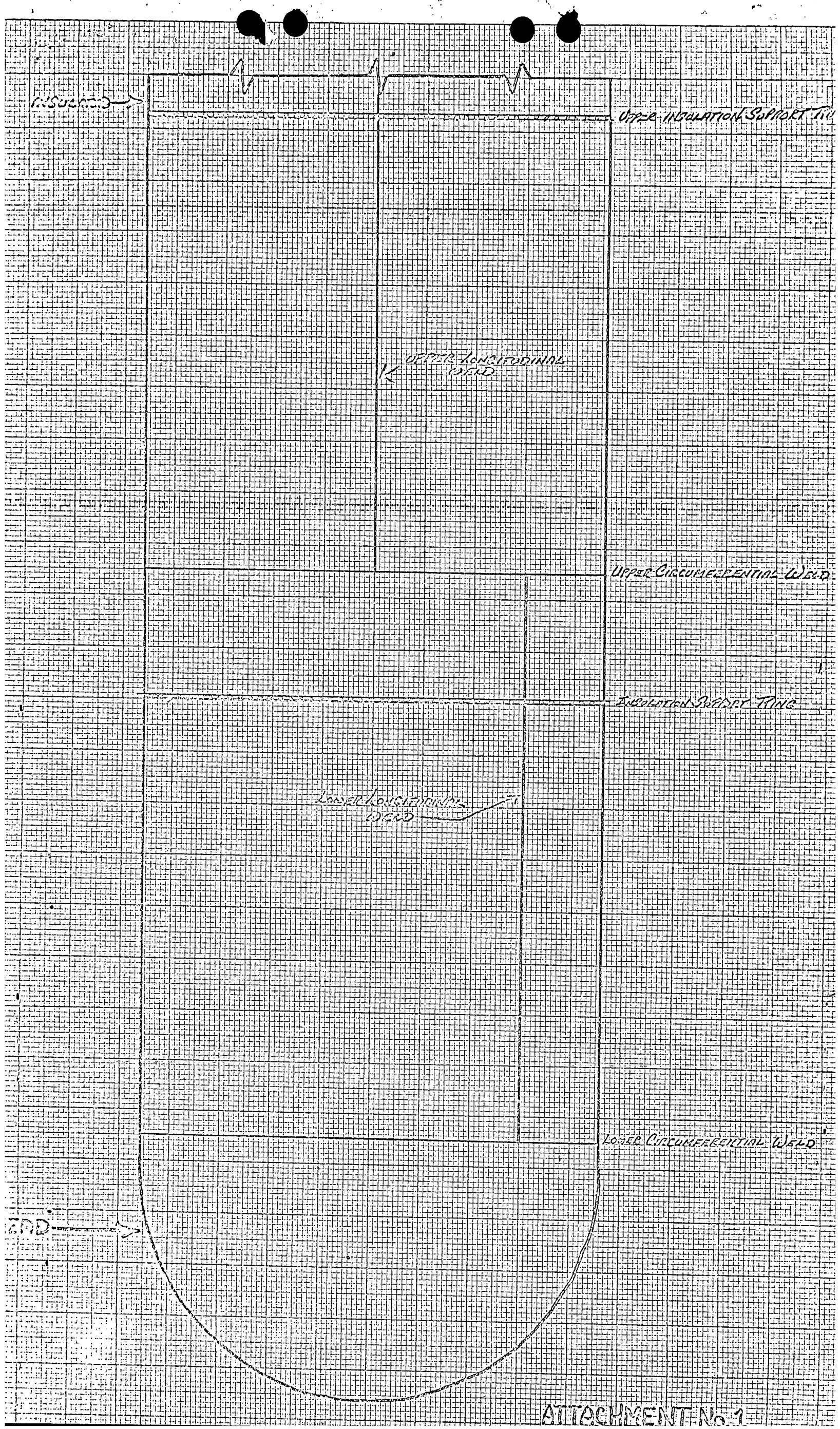
Enclosures:
Attachment Nos. 1 & 2

cc E. G. Case, DRS (3)
P. A. Morris, DRL
R. S. Boyd, DRL (2)
R. C. DeYoung, DRL (2)
D. J. Skovholt, DRL (3)
P. W. Howe, DRL (2)
L. Kornblith, Jr., CO
Regional Directors, CO
REG files



Blue - Weld
Black - 50-99 percent loss of back reflection.
Red - 100 percent loss of back reflection.

ATTACHMENT No. 2



ATTACHMENT No. 1

PRESSURIZER BASE PLATE QUALITY

INDIAN POINT UNIT 2, DOCKET NO. 50-247

We have reviewed the information submitted by the applicant, including Westinghouse reports (September 3, 1970) on the ultrasonic testing of local plate quality in the pressurizer for the Indian Point Unit No. 2.

It is noted that the initial ultrasonic inspection was performed in accordance with Code Case 1338-2, except that a 100% volumetric scanning was used, and that this examination was conducted prior to the material experiencing any fabrication and testing strains. As a result of a preservice inspection, an extension of indications was observed when the as-fabricated vessel was subjected to the UT mapping.

These UT examinations utilized longitudinal and angle beam techniques in order to determine (a) if the defects were laminar in nature, (b) if the groups of inclusions were joined by de-cohesion, or (c) if the groups of inclusions at different planes or depths were joined by transverse shear fracture planes. The latter condition, although not presently evidenced in the plate material, could be of concern since it would effectively reduce the material cross section which is available to accommodate hoop stress in that region. However, the stress conditions at this area in the vessel are not conducive to the growth of transverse shear fracture planes.

The reports do not indicate what potential exists, if any, with respect to the influence of pressurizer operating transients upon thermal cycling

OFFICE ▶						
SURNAME ▶						
DATE ▶						

occurring in the proximity of the defect location. However, the influence from these operating transients is only nominal in magnitude, because the rate of temperature changes is limited by the water-steam interphase transient. Under such conditions it is unlikely that the operating transients could accelerate additional de-cohesion and/or defect growth, because the defect location is free of geometrical discontinuities.

We concur that the defects are most likely small laminar inclusions of manganese sulphides.

We also concur that the indications observed in the plate are not inconsistent with the acceptance standards specified in the Section III Code. Our concurrence is based in part on the reported results of independent evaluations performed by participating observers, Southwest Research and U.S. Testing Company, who have stated that the reflectors observed with longitudinal UT scanning did not change to a transverse direction when scanned with angle-beam technique. However, it should be noted that the use of angle-beam technique under these conditions is, at best, difficult to interpret.

Recommendation

Based on our review of the submitted information and taking into account the above mentioned uncertainties, we recommend that the applicant augment the inservice inspection program to include a UT examination of the pressurizer plate at the affected area after the preoperational test program

OFFICE ▶						
SURNAME ▶						
DATE ▶						

for the reactor coolant system has been completed, and also a UT examination during the 1st and 2nd refueling outages. Should these examinations indicate no change in the defect pattern, the applicant may subsequently follow the inservice inspection requirements of the ASME Section XI Code, provided this defect area is included as part of the Category B examination requirements (Table IS-251).

OFFICE ▶						
SURNAME ▶						
DATE ▶						