# REACTOR CONTAINMENT BUILDING
# INTEGRATED LEAKAGE RATE TEST
# TYPES A, B, AND C
# PERIODIC TEST

CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

INDIAN POINT STATION - UNIT NO. 2

DOCKET NO 50-247

OPERATING LICENSE NO DPR-26

DECEMBER 1987

Prepared by

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASSACHUSETTS

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## REFERENCES


1. 10CFR Part 50 , Appendix J, Primary Reactor Containment Leakage Testing for Water-Cooled Power Reactors, January 5, 1987.

2. PT-3Y1, Integrated Leakage Rate Test, Indian Point Station - Unit No. 2, Surveillance Test Procedure.

3. ANSI N45.4, American National Standard, Leakage - Rate Testing of Containment Structures for Nuclear Reactors, March 16, 1972.

4. ANSI/ANS-56.8, Containment System Leakage Testing Requirements, January 20, 1987.[1]

5. IP2 Technical Specifications Section 4.4 Containment Tests, and Table 4.4-1 Containment Isolation Valves


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[1] This document used only as a guideline and any reference to said document in no way implies compliance.

# SECTION 1

# PURPOSE

The purpose of this report is to present a description and analysis of the December 1987 Periodic Type A Containment Integrated Leakage Rate Test (ILRT) and a summary of the Periodic Types B and C Local Leakage Rate Tests (LLRT's) conducted since September 1984 at the Indian Point Station - Unit No. 2 (IP2). IP2 is owned and operated by the Consolidated Edison Company of New York, Inc. (Con Edison). Specific plant information and technical data is contained in Attachment 1A.

Stone & Webster Engineering Corporation (SWEC) provided engineering consultation services to Con Edison during the performance of this test.

This report is submitted as required by 10CFR50, Appendix J, Paragraph V.B.

# ATTACHMENT 1A

# TEST DATA SUMMARY

## A. Plant Information

| | |
|---|---|
| Owner and Operator | Consolidated Edison Company of New York, Inc. |
| Plant | Indian Point Station - Unit No. 2 |
| Location | Buchanan, New York |
| Containment Type | VC/PWR |
| Docket Number | 50-247 |
| Operating License No. | DPR-26 |
| Date Test Completed | December 22, 1987 |

## B. Technical Data

| | |
|---|---|
| Containment Net Free Air Volume as Tested | 2,610,000 cu. ft. |
| Design Pressure | 52 psig |
| Calculated Peak Accident Pressure | 47 psig |
| Containment Design Temperature | 271 °F |
| Containment ILRT Average Temperature Limits | 60-100 °F |

# SECTION 2

# SUMMARY

## 2.1 TYPE A TEST

### 2.1.1 Test Summary

Pressurization for the ILRT began at approximately 0125 hours on December 20, 1987. At approximately 0144 hours one of the refrigerant air dryers was declared inoperable. This was due to a cracked capillary tube connected to the expansion valve in the freon loop. At approximately 0209 hours, five of the ten air compressors were secured resulting with a pressurization rate of approximately 2.0 psi per hour. At approximately 0715 hours another air compressor was started for a total capacity of 7,500 scfm with a fairly constant pressurization rate of 2.2 psi per hour. This rate was maintained throughout the remainder of the pressurization period. Investigations for leakage were conducted for all penetration areas during the pressurization period and throughout the Type A test. Containment pressurization equipment was secured at approximately 0048 hours on December 21, 1987, with a peak instantaneous pressure of 63.535 psia. The pressurization piping system was isolated and vented.

At approximately 0405 hours on December 21, 1987, a leak in excess of 3.5 scfm was observed at the weld channel test connection for the personnel airlock. This test connection is for the airlock door seals and equalizing valves. With this test connection valve open, the airlock barrier was reduced to the inner seal on the inner door, rather than two seals on both the inner and outer doors. The test connection was closed at approximately 0710 hours.

The procedural temperature stabilization criteria was satisfied at 0500 hours on December 21, 1987, but overall recovery from the personnel airlock isolation was not achieved until 1030 hours. Temperature, relative humidity, and pressure data was continuously recorded throughout the entire test period at 15 minute intervals.

The start time of the Type A test was shifted to 1830 hours on December 21, 1987, due to a stabilizing containment mass trend (See Attachment 2.1A). This stabilizing trend was due, in part, to the isolation of a 0.6 scfm leak on a zone 1 electrical penetration weld channel which was isolated at 1630 hours, but mainly was due to the containment temperature and vapor pressure trends finally assuming essentially linear trends (See Attachment 2.1B & 2.1C).

The Type A test was successfully completed at 1830 hours on December 22, 1987 with a Mass Point Upper Confidence Limit (UCL-MP) of 0.047726 percent/day and a Total Time Upper Confidence Limit (UCL-TT) of 0.033752 percent/day, (See Section 3.3, Test Results). Both the Mass Point and Total Time leakage rates were well below the 0.75 La acceptance criteria.

The Superimposed Leakage Verification test was started at 1945 hours and was successfully completed at 2345 hours on December 22, 1987. The results of the verification test satisfied the requirements set forth in Reference 2, (See Section 3.3, Test Results).

Depressurization of the containment commenced at 0030 hours and was completed at 1630 hours on December 23, 1987.

### 2.1.2 Conclusion

The December 1987 Indian Point Station - Unit No. 2 Type A Test was successfully completed, thus demonstrating the leak-tight integrity of the containment boundary. The Upper Confidence Levels (UCL) were well below the acceptance criteria of 0.075 percent/day as required by IP2 Technical Specifications.

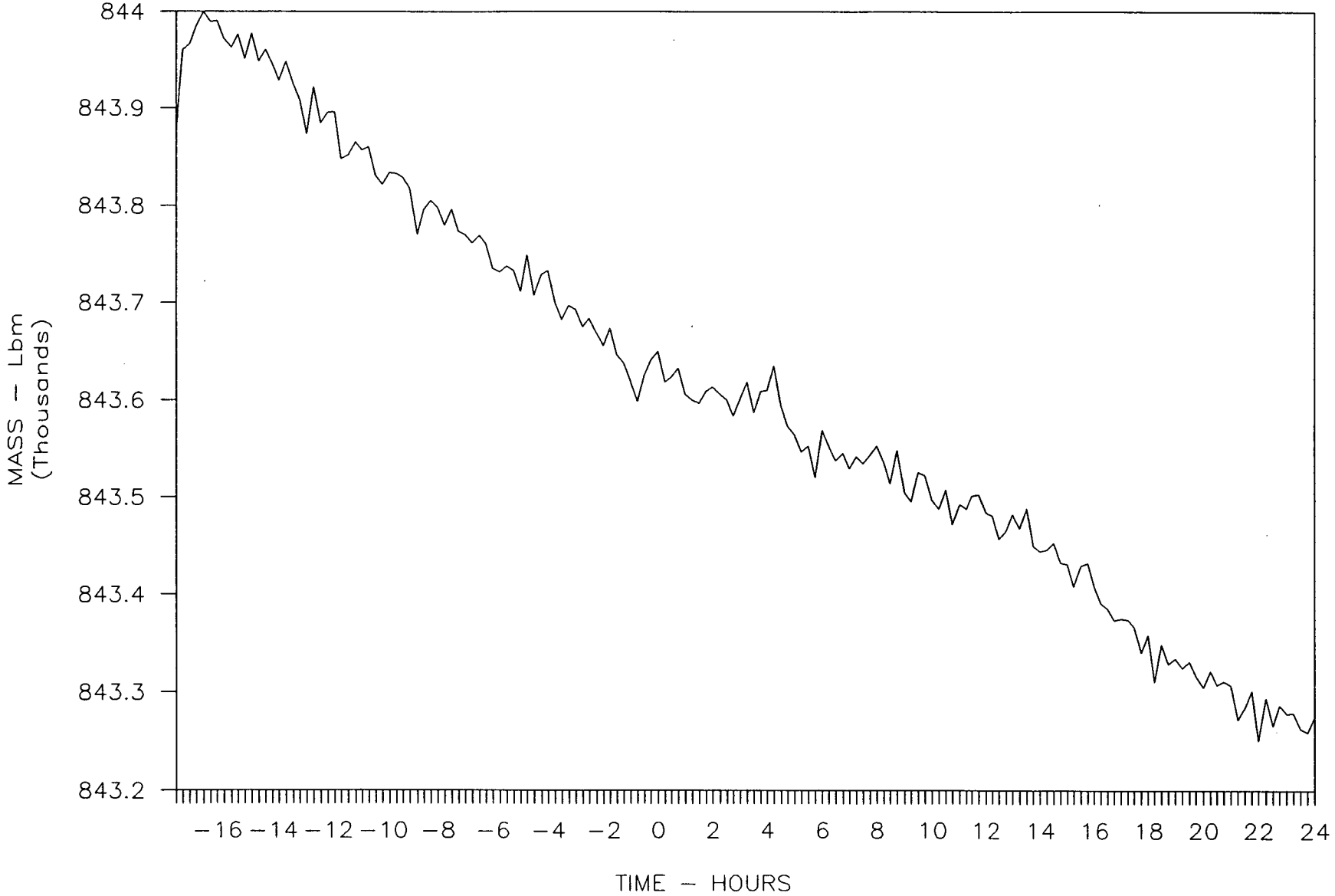
## 2.2 LOCAL LEAKAGE RATE TESTS (Types B and C)

The Local Leakage Rate Tests (LLRTs) of containment isolation valves and other containment penetrations were conducted as required by the methods described in the plant surveillance procedures for the Types B and C Tests.

Section 4 of this report summarizes the data for the two surveillance periods (1986 and 1987) of LLRT's conducted since the September 1984 Type A test in accordance with Appendix J, 10CFR50, Paragraph V.B. Also contained in Section 4 of this report is the 1987 LLRT Summary Analysis.

# CONTAINMENT MASS vs. TIME

INDIAN POINT 2 – ILRT – DECEMBER 1987

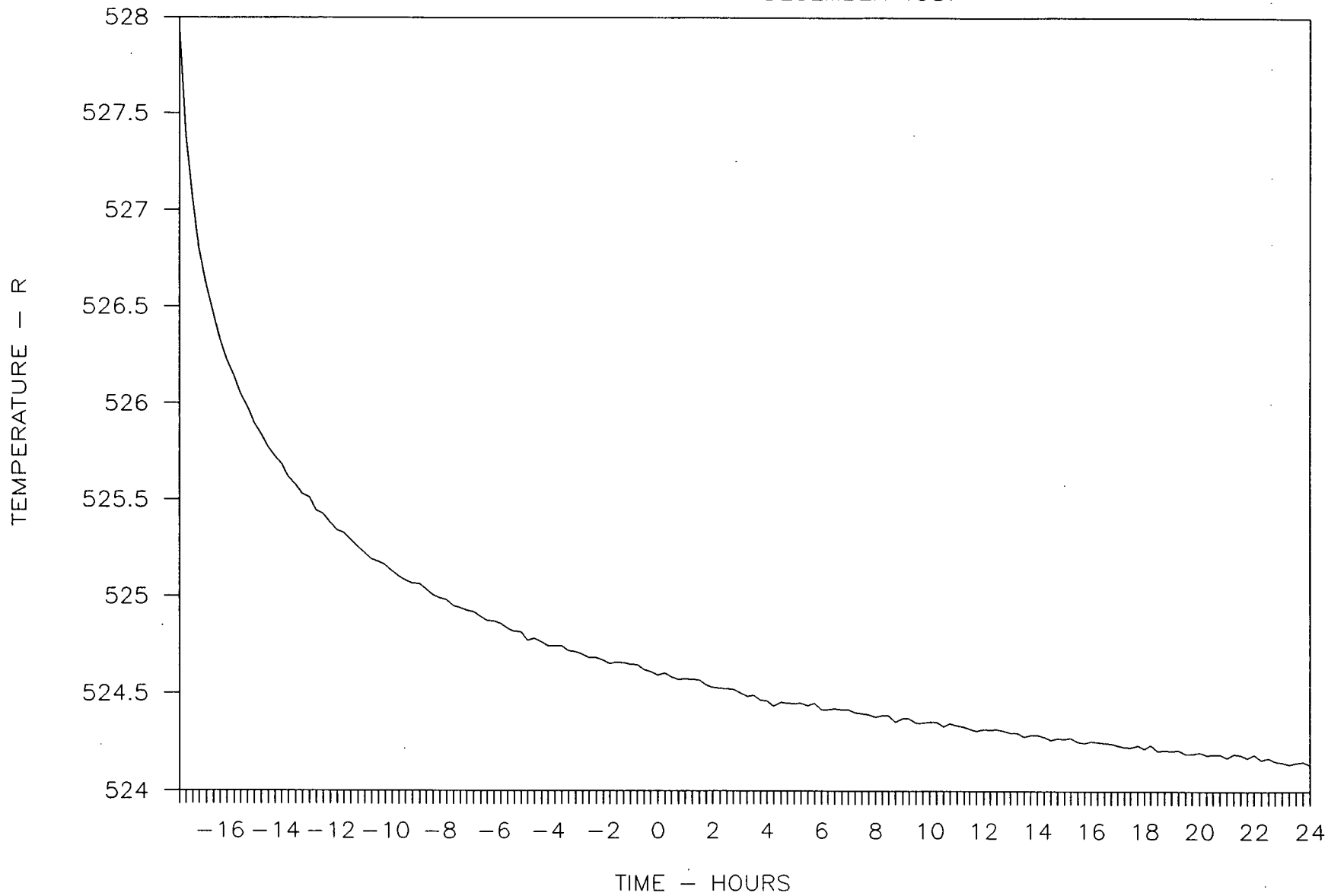



**ATTACHMENT 2.1A**

**GRAPH 1**

# CONTAINMENT TEMPERATURE vs. TIME

INDIAN POINT 2 – ILRT – DECEMBER 1987

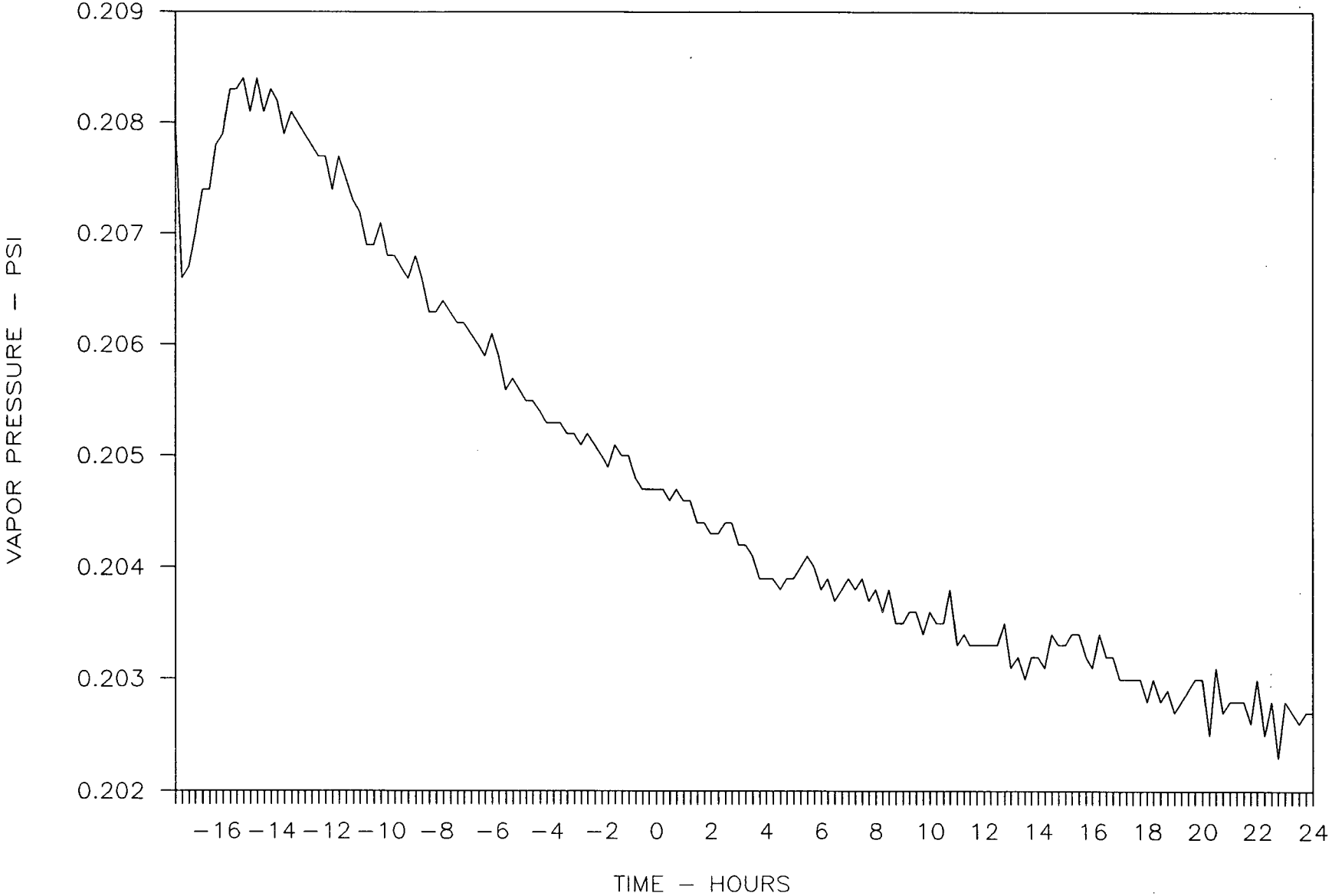



**ATTACHMENT 2.1B**

**GRAPH 2**

# CONTAINMENT VAPOR PRESSURE vs. TIME

INDIAN POINT 2 – ILRT – DECEMBER 1987




**ATTACHMENT 2.1C**

**GRAPH 3**

# SECTION 3

# TYPE A TEST

## 3.1 EDITED LOG OF EVENTS

This log was edited from information contained in the ILRT Test Director's Official Type A Log of Events and from the Control Room ILRT Log.

<u>December 19, 1987</u>

1705 - Secured containment sump pump and closed the isolation valves.

<u>December 20, 1987</u>

0000 - Closed and locked both airlocks.

0125 - Commenced pressurization of the containment.

0223 - Pressurization rate approximately 2 psi/hr.

0700 - Commenced leakage investigation survey of the accessible penetration areas.

0715 - Started another air compressor for a total of 7500 cfm. Pressurization rate increased to about 2.2 psi/hr.

0815 - No major leakage paths identified.

1315 - Observed minor leakage at the Weld Channel and Penetration Pressurization System (WCPPS) Zone 1 vent valve.

<u>December 21, 1987</u>

0055 - Pressurization of containment completed.

0100 - Started stabilization period.

0400 - Leakage investigation survey results identified a significant leakage path on the Elevation 95 Airlock. Other leakage paths identified were the Weld Channel Zone 1 vent valve (WPC-102), 25 FCU Service Water, and the Nitrogen to the accumulators.

0500 - Satisfied the temperature stabilization criteria, however, the temperature trend was not yet linear.

0710 - Determined that the Elevation 95 Foot Airlock leakage path was due to an improper valve alignment. This was rectified by closing WCP-94.

December 21, 1987

1630 - Checked lineup for the WCPPS Zone 1 which feeds the electrical penetrations. Isolated the Zone 1 vent valve WCP-102. Closed SA-24 and SA-24-1 on the service air penetration to containment.

1830 - Started the ILRT.

December 22, 1987

1830 - Successfully completed a 24 hour ILRT.

1845 - Initiated a 8.5 scfm flow for the Superimposed Leakage Verification Test.

1945 - Commenced the Superimposed Leakage Verification Test.

2345 - Successfully completed the Superimposed Leakage Verification Test.

December 23, 1987

0030 - Began containment depressurization.

1630 - Completed containment depressurization. Performed post-ILRT walkdown. Noted several broken light bulbs. No other abnormalities were noted.

## 3.2 GENERAL TEST DESCRIPTION

### 3.2.1 Prerequisites

In accordance with the Indian Point Station - Unit No. 2 ILRT Procedure PT-3Y1, the following is a listing of the pertinent prerequisites completed and documented prior to containment pressurization:

a. Site meteorological data recorded during the performance of the ILRT (Attachment 3.2A).

b. All required test instrumentation installed calibrated, and functionally verified within 6 months of the test.

c. Containment ventilation system secured.

d. Satisfactory inspection of the accessible interior and exterior surfaces of the containment structures and components performed.

e. Pressurization system installed, leak checked, and ready for operation.

f. RCS temperature maintained stable prior to and during the performance of the ILRT.

g. Data acquisition and computer systems used for the test are operational.

h. All required system valve lineups completed.

i. Equipment that could be damaged by external pressure either vented or removed from containment.

j. Safety exclusion area plan in effect.

k. An Official Type A Log of Events established and maintained by the ILRT Test Director.

l. All pressurized components removed from the containment.

m. Temporary copus blowers used for containment air circulation installed and operational.

n. All required Types B and C leakage rate testing completed.

o. Verification flowmeter installed, leak tested, and ready for operation.

### 3.2.2 Equipment and Instrumentation

Pressurization of the containment was achieved by the utilization of a temporary system consisting of ten diesel air compressors manifolded to aftercoolers and refrigerant air dryers. The system included adequate instrumentation and valving to maintain proper monitoring and control of the compressed air quality throughout the pressurization sequence. The total capacity of the pressurization system was rated at approximately 10,200 standard cubic feet per minute (SCFM). Air was supplied to the containment through the plant's permanent ILRT System, which includes additional components and instrumentation for monitoring and controlling containment pressurization.

The various containment parameters required to calculate containment leakage during the test, were monitored using instrumentation which consisted of 34 resistance temperature detectors (RTD's), 7 relative humidity detectors (RHD's), and 2 absolute pressure quartz manometers. Pertinent data for the test instrumentation is listed in Attachment 3.2B, and the general locations of the test instrumentation for the containment is shown in Attachments 3.2C through 3.2F.

A rotometer was used to perform the superimposed leakage verification test.

Instrument Selection Guide (ISG)

| Sensor Type | No. of Sensors | Sensitivity Error | System Error |
|---|---|---|---|
| Pressure | 2 | 0.002 | 0.000 |
| Temperature | 34 | 0.100 | 0.100 |
| Dewpoint Temp. | 7 | 0.100 | 0.250 |

| | |
|---|---|
| Test Length | 24 hrs. |
| Test Pressure | 61.696 psia |
| Test Temperature | 64 °F = 524 °R |
| Test Dewpoint Temp. | 58 °F |

$$ISG = \pm \frac{2400}{t}\left[2\left(\frac{EP}{P}\right)^2 + 2\left(\frac{ET}{T}\right)^2 + 2\left(\frac{EP_v}{P_v}\right)^2\right]^{1/2}$$

ISG $\leq$ 0.25 $L_a$ which equals 0.025% per day since $L_a$ = 0.1% per day

a. EP = error associated with absolute pressure instruments

$EP = 0.002/\sqrt{2}$

$EP = 0.001415$

b. ET = error associated with temperature instruments

$ET = 0.141422/\sqrt{34}$

$ET = 0.024254$

c. $EP_v$ = error associated with vapor pressure instruments

$EP_v = 0.002310/\sqrt{7}$

$EP_v = 0.000873$

Using values established in a,b and c above, calculate ISG.

$$ISG = \pm \frac{2400}{24}\left[2\left(\frac{0.001415}{61.696}\right)^2 + 2\left(\frac{0.024254}{524}\right)^2 + 2\left(\frac{0.000873}{61.696}\right)^2\right]^{1/2}$$

ISG = 0.0076 which is less than 0.025%/day (25% of $L_a$)

### 3.2.3 Data Acquisition System

The Indian Point Station - Unit No. 2 ILRT sensor data were recorded at approximately 15 minute intervals during the test. A programmable, multichannel data logger was used to scan and record data from the 34 resistance temperature detectors, 7 relative humidity detectors, and 2 absolute pressure quartz manometers signal inputs. Data readings of the rotometer were manually recorded.

### 3.2.4 Data Resolution System

The recorded data was inputted to the Stone & Webster Engineering Corporation's (SWEC) portable computers for data reduction and leakage rate calculations. Both the Mass Point and Total Time Analysis Methods were used to determine the leakage rate.

Absolute Method of Mass Point Analysis

The Absolute Method of Mass Point Analysis consists of calculating the air mass within the containment structure, over the test period using pressure, temperature, and relative humidity observations made during the ILRT. The air mass is computed using the ideal gas law as follows:

$$M = \frac{144V(P-P_v)}{RT} \qquad \text{(Eq. 1)}$$

where:

$M$ = air mass, lbm
$P$ = total pressure, psia
$P_v$ = average vapor pressure, psia
$R$ = 53.35 ft-lbf/lbm°R (for air)
$T$ = average containment temperature, °R
$V$ = containment free volume, $ft^3$

The leakage rate is then determined by plotting the air mass as a function of time, using a least-squares fit to determine the slope, $A = dM/dT$. The leakage rate is expressed as a percentage of the air mass lost in 24 hours or symbolically:

$$\text{Leakage Rate} = -2400\,(A/B) \qquad \text{(Eq. 2)}$$

Where A is the slope of the least-squares curve and B is the y-intercept. The sign convention is such that the leakage out of the containment is positive, and the units are in percent/day.

The air mass is calculated and the result is correlated as a function of time by means of a least-squares curve fit of the form:

$$M = At + B \qquad \text{(Eq. 3)}$$

The slope A and y-intercept B are then used in Equation 2 to determine the leakage rate.

A confidence interval is calculated using a Students T distribution. The sum of the leakage rate and confidence interval is the Upper Confidence Limit - Mass Point (UCL-MP).

Absolute Method of Total Time Analysis

The Absolute Method of Total Time Analysis consists of calculating air lost from the containment, using pressure, temperature, and relative humidity observations made during the ILRT.

The containment air mass is computed using Equation 1. The measured leakage rate at any time (t) is then determined by subtracting the mass at that time (Mt) from the initial mass (Mi) and dividing by the initial mass. The measured leakage rate is expressed as a percentage of containment mass lost in 24 hours or symbolically:

$$\text{Measured Leakage Rate} = 2400 \frac{(Mi-Mt)}{Mi(\Delta t)} \qquad \text{(Eq. 4)}$$

The sign convention is such that leakage out of the containment is positive, and the units are in percent/day.

The calculated leakage rate is then determined by plotting the measured leakage rate as a function of time and then performing a least-squares curve fit of the measured leakage rate values as follows:

$$\text{Calculated Leakage Rate} = At + B \qquad \text{(Eq. 5)}$$

Where, A is the slope and B is the y-intercept of the least squares curve.

A confidence interval is calculated using a Students T distribution. The sum of the calculated leakage rate and the confidence interval is the Upper Confidence Limit - Total Time (UCL-TT).

## ATTACHMENT 3.2A

## SITE METEOROLOGY

| Date | Time | Ambient Air Temp(°F) | WWD Speed (MPH) | Wind Direction (Degrees) |
|---|---|---|---|---|
| December 19, 1987 | 17:00 | 39.8 | 2.4 | 273 |
| | 18:00 | 39.9 | 2.9 | 270 |
| | 19:00 | 39.9 | 3.6 | 298 |
| | 20:00 | 39.8 | 2.1 | 325 |
| | 21:00 | 39.4 | 2.9 | 324 |
| | 22:00 | 38.7 | 2.8 | 338 |
| | 23:00 | 37.4 | 0.9 | 031 |
| December 20, 1987 | 00:00 | 34.8 | 1.7 | 014 |
| | 01:00 | 33.9 | 1.3 | 024 |
| | 02:00 | 34.1 | 0.8 | 022 |
| | 03:00 | 34.2 | 0.5 | 351 |
| | 04:00 | 33.4 | 0.5 | 358 |
| | 05:00 | 32.5 | 1.1 | 095 |
| | 06:00 | 32.8 | 1.6 | 131 |
| | 07:00 | 33.6 | 3.2 | 158 |
| | 08:00 | 33.9 | 1.8 | 138 |
| | 09:00 | 34.2 | 1.6 | 170 |
| | 10:00 | 36.2 | 1.4 | 129 |
| | 11:00 | 37.0 | 1.3 | 111 |
| | 12:00 | 37.6 | 1.8 | 194 |
| | 13:00 | 39.9 | 3.5 | 159 |
| | 14:00 | 41.3 | 4.6 | 161 |
| | 15:00 | 42.0 | 3.1 | 177 |
| | 16:00 | 42.5 | 1.5 | 159 |
| | 17:00 | 42.9 | 2.2 | 185 |
| | 18:00 | 43.3 | 2.4 | 177 |
| | 19:00 | 43.3 | 0.8 | 086 |
| | 20:00 | 43.4 | 1.0 | 017 |
| | 21:00 | 42.7 | 2.0 | 037 |
| | 22:00 | 42.5 | 1.0 | 101 |
| | 23:00 | 42.6 | 0.9 | 274 |
| December 21, 1987 | 00:00 | 43.3 | 1.1 | 246 |
| | 01:00 | 43.7 | 1.6 | 020 |
| | 02:00 | 46.0 | 2.3 | 014 |
| | 03:00 | 47.4 | 5.2 | 331 |
| | 04:00 | 45.8 | 7.3 | 332 |
| | 05:00 | 44.3 | 6.4 | 326 |
| | 06:00 | 43.4 | 5.8 | 332 |

ATTACHMENT 3.2A (Cont.)

SITE METEOROLOGY

| Date | Time | Ambient Air Temp(°F) | WWD Speed (MPH) | Wind Direction (Degrees) |
|---|---|---|---|---|
| December 21, 1987 | 07:00 | 42.7 | 3.9 | 357 |
| | 08:00 | 42.0 | 3.4 | 353 |
| | 09:00 | 41.5 | 3.6 | 325 |
| | 10:00 | 41.2 | 2.9 | 338 |
| | 11:00 | 41.6 | 2.2 | 269 |
| | 12:00 | 41.6 | 4.2 | 242 |
| | 13:00 | 42.5 | 3.9 | 234 |
| | 14:00 | 43.7 | 5.7 | 247 |
| | 15:00 | 44.0 | 5.4 | 266 |
| | 16:00 | 43.3 | 4.5 | 257 |
| | 17:00 | 42.5 | 2.1 | 218 |
| | 18:00 | 41.8 | 2.5 | 258 |
| | 19:00 | 40.5 | 2.1 | 215 |
| | 20:00 | 38.5 | 2.5 | 218 |
| | 21:00 | 36.3 | 2.4 | 196 |
| | 22:00 | 34.8 | 2.0 | 213 |
| | 23:00 | 34.2 | 2.3 | 217 |
| December 22, 1987 | 00:00 | 35.0 | 3.0 | 252 |
| | 01:00 | 35.5 | 3.7 | 260 |
| | 02:00 | 34.9 | 3.0 | 295 |
| | 03:00 | 35.9 | 2.8 | 313 |
| | 04:00 | 35.9 | 2.4 | 168 |
| | 05:00 | 33.9 | 1.6 | 129 |
| | 06:00 | 33.4 | 1.7 | 156 |
| | 07:00 | 32.0 | 0.7 | 322 |
| | 08:00 | 31.5 | 0.7 | 040 |
| | 09:00 | 32.8 | 0.8 | 209 |
| | 10:00 | 34.3 | 1.8 | 012 |
| | 11:00 | 36.6 | 2.9 | 222 |
| | 12:00 | 38.3 | 3.0 | 194 |
| | 13:00 | 39.5 | 3.0 | 189 |
| | 14:00 | 40.6 | 3.8 | 186 |
| | 15:00 | 42.6 | 4.8 | 166 |
| | 16:00 | 42.6 | 3.9 | 172 |
| | 17:00 | 41.8 | 4.7 | 163 |
| | 18:00 | 40.4 | 2.7 | 167 |
| | 19:00 | 39.5 | 0.6 | 098 |
| | 20:00 | 38.7 | 0.8 | 035 |
| | 21:00 | 37.6 | 0.7 | 017 |
| | 22:00 | 36.9 | 1.3 | 019 |
| | 23:00 | 36.9 | 1.6 | 013 |

ATTACHMENT 3.2A (Cont.)

SITE METEOROLOGY

| Date | Time | Ambient Air Temp(°F) | WWD Speed (MPH) | Wind Direction (Degrees) |
|---|---|---|---|---|
| December 23, 1987 | 00:00 | 35.7 | 1.7 | 008 |
| | 01:00 | 34.6 | 3.7 | 260 |
| | 02:00 | 33.8 | 3.0 | 295 |
| | 03:00 | 33.6 | 2.8 | 313 |
| | 04:00 | 33.8 | 2.4 | 168 |
| | 05:00 | 36.0 | 1.6 | 129 |
| | 06:00 | 38.4 | 1.7 | 156 |
| | 07:00 | 38.3 | 0.7 | 322 |
| | 08:00 | 37.3 | 0.7 | 040 |
| | 09:00 | 37.0 | 0.8 | 209 |
| | 10:00 | 39.1 | 1.8 | 012 |
| | 11:00 | 40.8 | 2.9 | 222 |
| | 12:00 | 41.8 | 3.0 | 194 |
| | 13:00 | 40.8 | 3.0 | 189 |
| | 14:00 | 42.3 | 3.8 | 186 |
| | 15:00 | 42.5 | 4.8 | 166 |
| | 16:00 | 42.6 | 3.9 | 172 |
| | 17:00 | 42.2 | 4.7 | 163 |
| | 18:00 | 41.6 | 2.7 | 167 |
| | 19:00 | 40.6 | 0.6 | 098 |
| | 20:00 | 39.2 | 0.8 | 035 |
| | 21:00 | 36.9 | 0.7 | 017 |
| | 22:00 | 35.9 | 1.3 | 019 |
| | 23:00 | 35.5 | 1.6 | 013 |

ATTACHMENT 3.2B

INSTRUMENTATION LIST

The following instruments were calibrated and functionally verified within 6 months prior to the performance of this test and in accordance with 10CFR50, Appendix J, using instrumentation traceable to the National Bureau of Standards.

| Instrument | Factor | Weight Channel | Sensor No. | Zone | Assoc. RTD | Elevation | Range | Accuracy |
|---|---|---|---|---|---|---|---|---|
| A. Temperature | | | | | | | | |
| RTD1 | 0.030163 | C0 | T01 | 1 | | 212' | 0-150°F | ±0.5°F |
| RTD2 | 0.030163 | C1 | T02 | 1 | | 212' | 0-150°F | ±0.5°F |
| RTD3 | 0.030163 | C2 | T03 | 1 | | 212' | 0-150°F | ±0.5°F |
| RTD4 | 0.029708 | C3 | T04 | 5 | | 68' | 0-150°F | ±0.5°F |
| RTD5 | 0.030163 | C4 | T05 | 1 | | 212' | 0-150°F | ±0.5°F |
| RTD6 | 0.030163 | C5 | T06 | 1 | | 212' | 0-150°F | ±0.5°F |
| RTD7 | 0.030163 | C6 | T07 | 1 | | 212' | 0-150°F | ±0.5°F |
| RTD8 | 0.030163 | C7 | T08 | 1 | | 212' | 0-150°F | ±0.5°F |
| RTD9 | 0.031534 | C8 | T09 | 2 | | 161' | 0-150°F | ±0.5°F |
| RTD10 | 0.031534 | C9 | T10 | 2 | | 161' | 0-150°F | ±0.5°F |
| RTD11 | 0.031534 | C10 | T11 | 2 | | 161' | 0-150°F | ±0.5°F |
| RTD12 | 0.031534 | C11 | T12 | 2 | | 161' | 0-150°F | ±0.5°F |
| RTD13 | 0.031534 | C12 | T13 | 2 | | 161' | 0-150°F | ±0.5°F |
| RTD14 | 0.031534 | C13 | T14 | 2 | | 161' | 0-150°F | ±0.5°F |
| RTD15 | 0.031535 | C14 | T15 | 2 | | 161' | 0-150°F | ±0.5°F |
| RTD16 | 0.031535 | C15 | T16 | 2 | | 161' | 0-150°F | ±0.5°F |
| RTD17 | 0.028792 | C16 | T17 | 3 | | 120' | 0-150°F | ±0.5°F |
| RTD18 | 0.028792 | C17 | T18 | 3 | | 120' | 0-150°F | ±0.5°F |
| RTD19 | 0.028792 | C18 | T19 | 3 | | 120' | 0-150°F | ±0.5°F |
| RTD20 | 0.028792 | C19 | T20 | 3 | | 120' | 0-150°F | ±0.5°F |
| RTD21 | 0.028792 | C40 | T21 | 3 | | 120' | 0-150°F | ±0.5°F |
| RTD22 | 0.028792 | C41 | T22 | 3 | | 120' | 0-150°F | ±0.5°F |
| RTD23 | 0.000000 | C102 | T23 | 3 | | 120' | 0-150°F | ±0.5°F |
| RTD24 | 0.000000 | C103 | T24 | 3 | | 120' | 0-150°F | ±0.5°F |

ATTACHMENT 3.2B (Cont.)

INSTRUMENTATION LIST

| Instrument | Factor | Weight Channel | Sensor No. | Zone | Assoc. RTD | Elevation | Range | Accuracy |
|---|---|---|---|---|---|---|---|---|
| RTD23 | 0.000000 | C102 | T23 | 3 | | 120' | 0-150°F | ±0.5°F |
| RTD24 | 0.000000 | C103 | T24 | 3 | | 120' | 0-150°F | ±0.5°F |
| RTD25 | 0.030163 | C44 | T25 | 1 | | 212' | 0-150°F | ±0.5°F |
| RTD26 | 0.030163 | C45 | T26 | 1 | | 212' | 0-150°F | ±0.5°F |
| RTD27 | 0.000000 | C46 | T27 | 4 | | 98' | 0-150°F | ±0.5°F |
| RTD28 | 0.025051 | C47 | T28 | 4 | | 98' | 0-150°F | ±0.5°F |
| RTD29 | 0.025052 | C48 | T29 | 4 | | 98' | 0-150°F | ±0.5°F |
| RTD30 | 0.025052 | C49 | T30 | 4 | | 98' | 0-150°F | ±0.5°F |
| RTD31 | 0.025052 | C50 | T31 | 4 | | 98' | 0-150°F | ±0.5°F |
| RTD32 | 0.025052 | C51 | T32 | 4 | | 98' | 0-150°F | ±0.5°F |
| RTD33 | 0.029708 | C52 | T33 | 5 | | 68' | 0-150°F | ±0.5°F |
| RTD34 | 0.029708 | C53 | T34 | 5 | | 68' | 0-150°F | ±0.5°F |
| RTD35 | 0.000000 | C100 | T35 | 5 | | 68' | 0-150°F | ±0.5°F |
| RTD36 | 0.029708 | C104 | T36 | 5 | | 68' | 0-150°F | ±0.5°F |
| RTD37 | 0.000000 | C56 | T37 | 5 | | 68' | 0-150°F | ±0.5°F |
| RTD38 | 0.029708 | C57 | T38 | 5 | | 68' | 0-150°F | ±0.5°F |
| RTD39 | 0.000000 | C58 | T39 | 5 | | 68' | 0-150°F | ±0.5°F |
| RTD40 | 0.029708 | C101 | T40 | 5 | | 68' | 0-150°F | ±0.5°F |

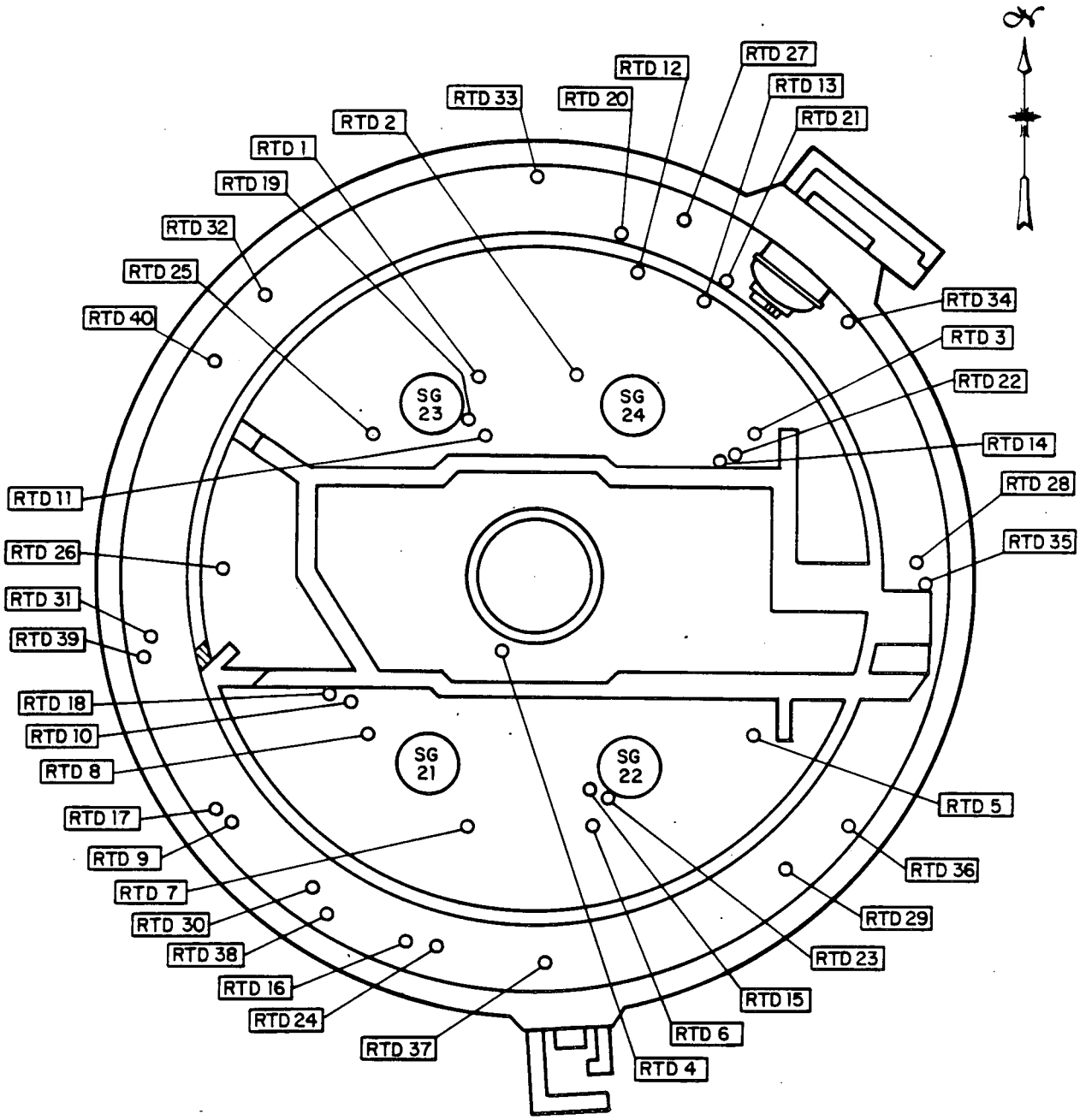
B. Relative Humidity

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| RHD1 | 0.092318 | C110 | D01 | 1 | T02 | 210' | 0-100%R.H. | ±2.5%R.H. |
| RHD2 | 0.000000 | C111 | D02 | 1 | | 210' | 0-100%R.H. | ±2.5%R.H. |
| RHD3 | 0.092318 | C112 | D03 | 1 | T06 | 210' | 0-100%R.H. | ±2.5%R.H. |
| RHD4 | 0.092318 | C113 | D04 | 1 | T26 | 210' | 0-100%R.H. | ±2.5%R.H. |
| RHD5 | 0.194691 | C114 | D05 | 2 | T10 | 161' | 0-100%R.H. | ±2.5%R.H. |
| RHD6 | 0.194691 | C115 | D06 | 2 | T11 | 161' | 0-100%R.H. | ±2.5%R.H. |
| RHD7 | 0.166832 | C116 | D07 | 5 | T38 | 68' | 0-100%R.H. | ±2.5%R.H. |
| RHD8 | 0.000000 | C117 | D08 | 5 | | 68' | 0-100%R.H. | ±2.5%R.H. |
| RHD9 | 0.000000 | C118 | D09 | 5 | | 68' | 0-100%R.H. | ±2.5%R.H. |
| RHD10 | 0.166832 | C119 | D10 | 5 | T36 | 68' | 0-100%R.H. | ±2.5%R.H. |

ATTACHMENT 3.2B (Cont.)

INSTRUMENTATION LIST

| | Instrument | | Weight Factor | Channel | Zone | Azimuth | Elevation | Range | Accuracy |
|---|---|---|---|---|---|---|---|---|---|
| C. | Pressure | | | | | | | | |
| | PIT1 | 0.500000 | C140 | P01 | - | - | - | 0-100 psia | ±0.02% |
| | PIT2 | 0.500000 | C160 | P02 | - | - | - | 0-100 psia | ±0.02% |
| D. | Superimposed Leakage Verification Test Flow Instrument | | | | | | | | |
| | Rotameter | - | Local | - | - | - | | 1.5-15 scfm | ±1.0%F.S. |




PLAN VIEW

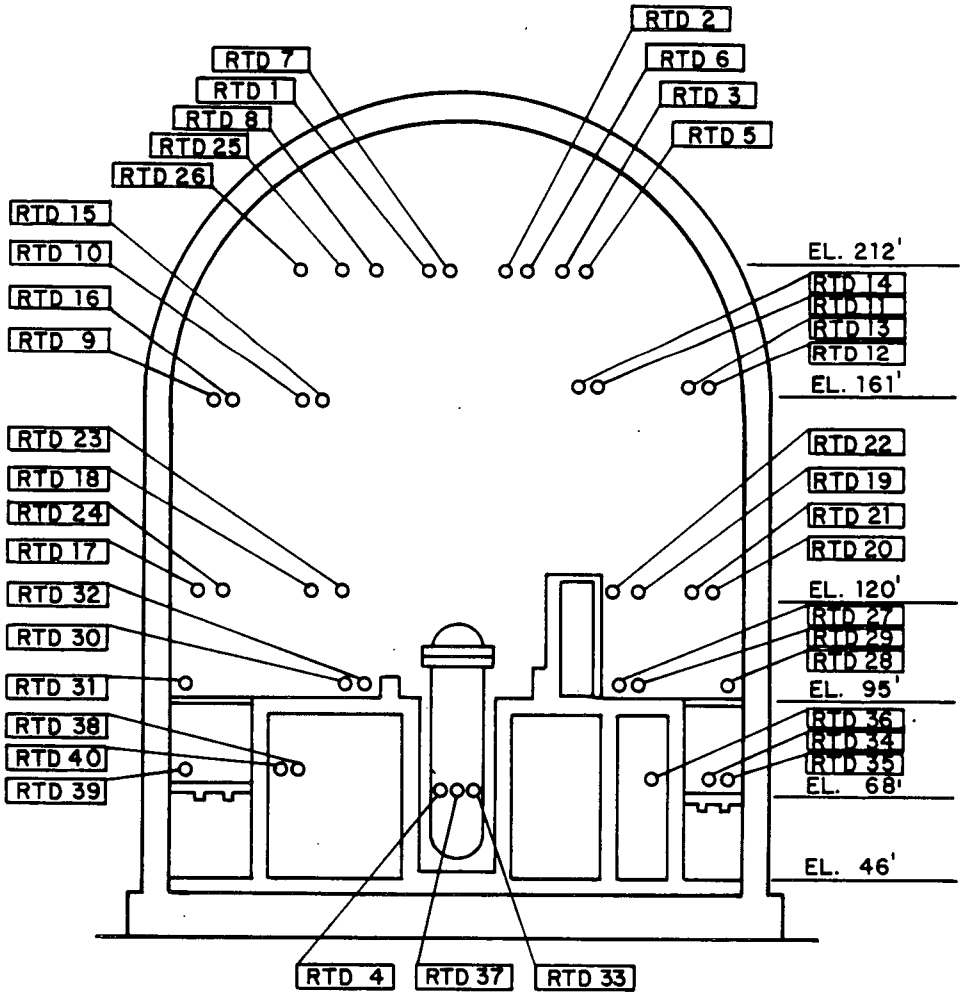
NOTES:

1. INSTRUMENT LOCATIONS SHOWN ARE ONLY APPROXIMATE, REFERENCE IP2 DWG. No. A206586

ATTACHMENT 3.2C

ILRT RESISTANCE TEMPERATURE DETECTOR LOCATIONS (RTD)

INDIAN POINT STATION - UNIT No. 2

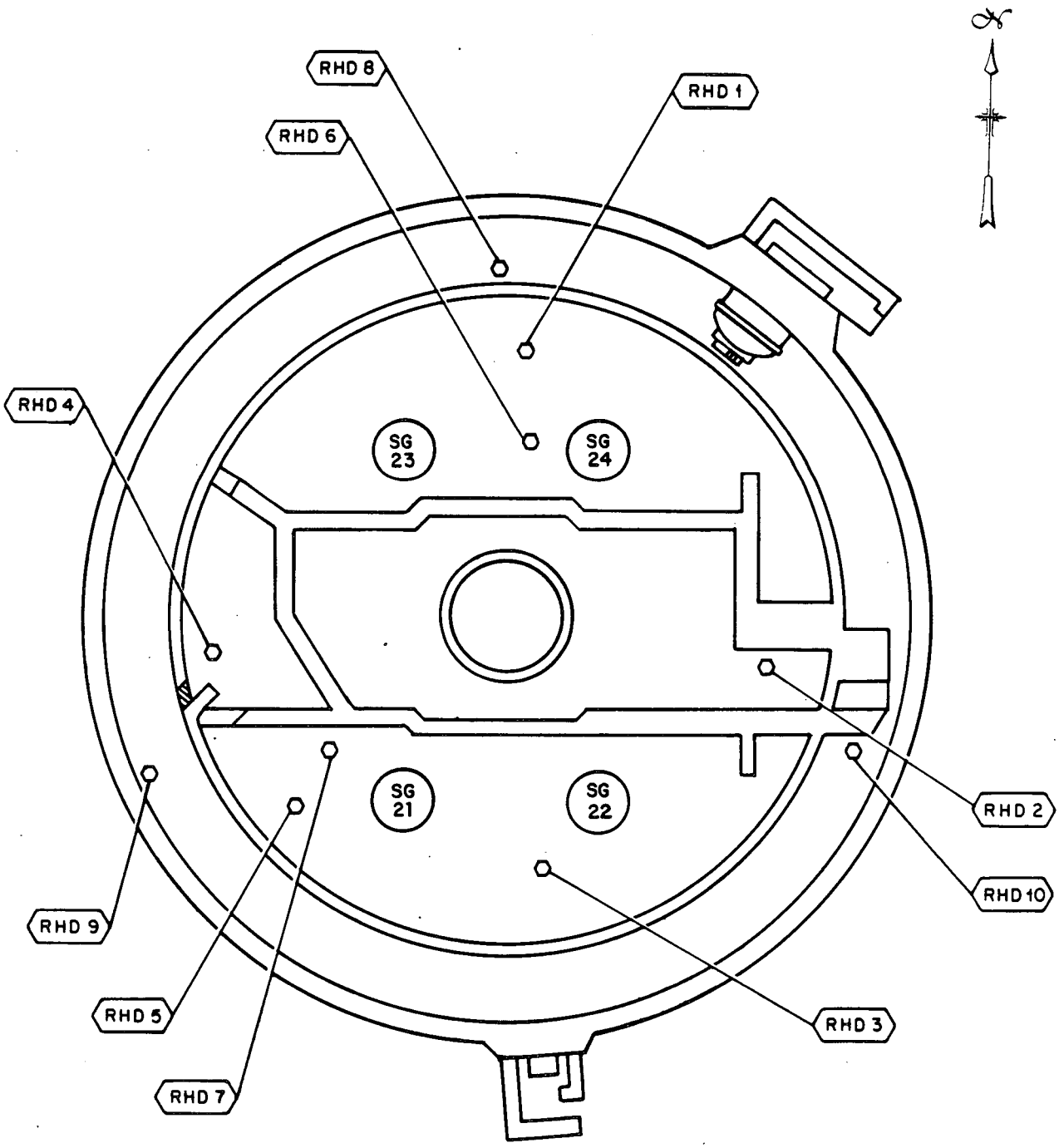



PROFILE VIEW

NOTES:

1. INSTRUMENT LOCATIONS SHOWN ARE ONLY APPROXIMATE, REFERENCE IP2 DWG. No. A206586

ATTACHMENT 3.2D
ILRT RESISTANCE TEMPERATURE DETECTOR LOCATIONS (RTD)
INDIAN POINT STATION - UNIT No. 2




PLAN VIEW

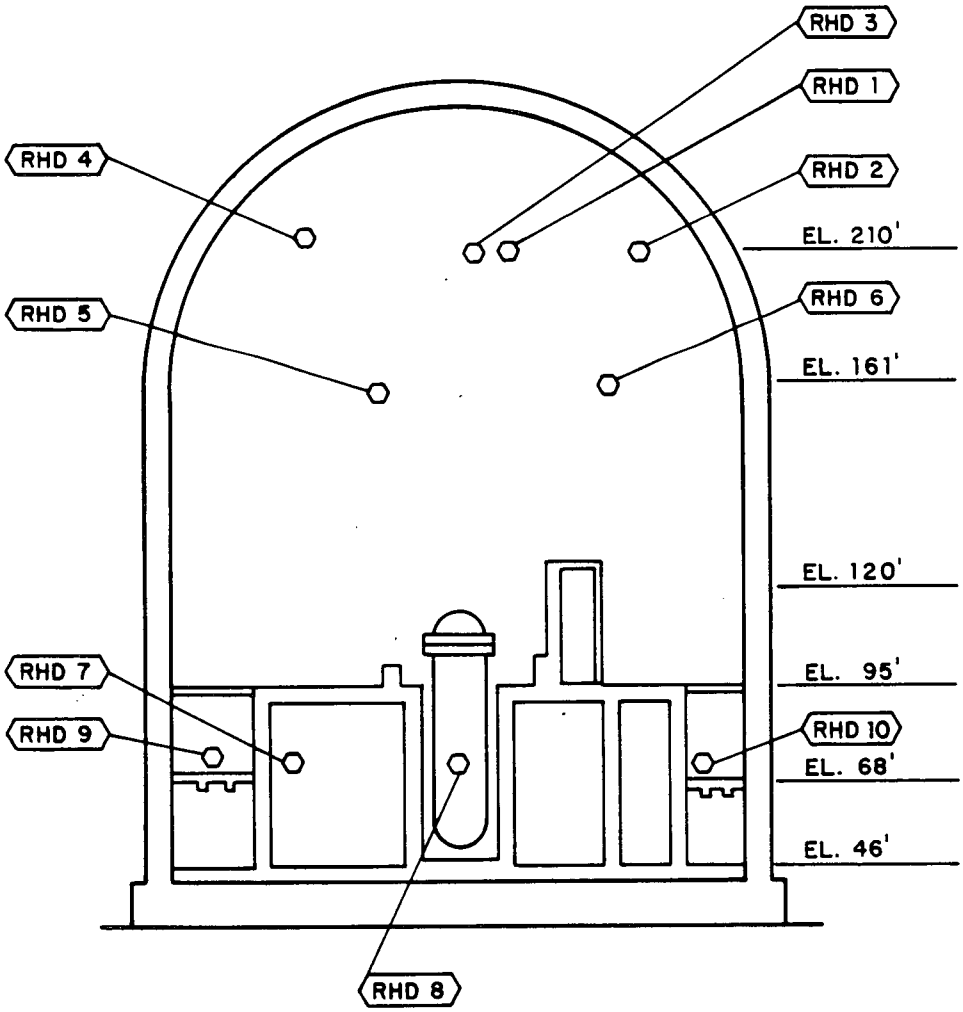
NOTES:

1. INSTRUMENT LOCATIONS SHOWN ARE ONLY APPROXIMATE, REFERENCE IP2 DWG. No. A206586

ATTACHMENT 3.2 E

ILRT RELATIVE HUMIDITY DETECTOR LOCATIONS (RHD)

INDIAN POINT STATION - UNIT No. 2




PROFILE VIEW

NOTES:

1. INSTRUMENT LOCATIONS SHOWN ARE ONLY APPROXIMATE, REFERENCE IP2 DWG. No. A206586

ATTACHMENT 3.2F
ILRT RELATIVE HUMIDITY DETECTOR LOCATIONS (RHD)
INDIAN POINT STATION - UNIT No. 2

## 3.3 TEST RESULTS

### 3.3.1 Presentation of Test Results

The test data for the December 1987 ILRT is based on a 24 hour test period starting at 1830 hours on December 21, 1987. The final test results were determined using SWEC's ILRT computer program. The Measured Input Data, Reduced Input Variables, Mass Point Analysis Test Results, Total Time Analysis Test Results, and representative graphs are contained in Attachments 3.3A through 3.3J.

Both the Mass Point and Total Time Analysis Test Results for the ILRT satisfied the procedural acceptance criteria.

The Type A Test instrumentation was verified by the Superimposed Leakage Verification Test Method. The Measured Input Data, Reduced Input Variables, Mass Point Analysis Test Results, Total Time Analysis Test Results, and representative graphs are contained in Attachments 3.3K through 3.3R.

Both the Mass Point and Total Time Analysis Test Results for the Superimposed Leakage Verification Test satisfied the procedural acceptance criteria.

### 3.3.2 61.696 psia ILRT Results

The 61.696 psia ILRT was conducted in accordance with the Indian Point Station-Unit No. 2 surveillance test procedure PT-3Y1. The results for the ILRT and for the Supplemental Test are shown below.

#### 3.3.2.1 ILRT Results - Mass Point Analysis

| Item | (Percent/Day) |
|---|---|
| 1. Lam, Leakage Rate Calculated | 0.046279 |
| 2. UCL, Upper Confidence Level | 0.001447 |
| 3. UCL-MP, Lam Leakage Rate plus UCL (1&2) | 0.047726 |

Results were within the acceptable limits of 0.75 La or 0.075 percent/day.

#### 3.3.2.2 ILRT Results - Total Time Analysis

| Item | (Percent/Day) |
|---|---|
| 1. Lam, Leakage Rate Calculated | 0.032925 |
| 2. UCL, Upper Confidence Level | 0.000827 |
| 3. UCL-TT, Lam Leakage Rate plus UCL (1&2) | 0.033752 |

Results were within the acceptable limits of 0.75 La or 0.075 percent/day.

### 3.3.2.3 Supplemental Test Results

The Supplemental Verification Test was performed using the Superimposed Leakage Verification Test Method in accordance with surveillance test procedure PT-3Y1. The results for the Superimposed Leakage Verification Test are shown below.

1. The Superimposed Leakage Verification Test is acceptable provided Lc falls within the following range:

   $(Lam + Lo - 0.25\ La) \leq Lc \leq (Lam + Lo + 0.25\ La)$

   Where: Lam = Type A calculated leakage (computer)
   (Lam - MP = 0.046279 %/day)
   (Lam - TT = 0.032925 %/day)

   Lo = Superimposed leakage rate developed from rotometer
   (Lo = 0.098668 %/day)

   La = Maximum allowable leakage rate
   (La = 0.1 %/day)

   Lc = Composite leakage (computer)
   (Lc - MP = 0.126691 %/day)
   (Lc - TT = 0.126444 %/day)

a. Mass Point

$$(0.046279 + 0.098668 - 0.025) \leq 0.126691 \leq (0.046279 + 0.098668 + 0.025)$$

$$(0.119947) \leq 0.126691 \leq (0.169947)$$

b. Total Time

$$(0.032925 + 0.098668 - 0.025) \leq 0.126444 \leq (0.032925 + 0.098668 + 0.025)$$

$$(0.106593) \leq 0.126444 \leq (0.156593)$$

The Superimposed Leakage Verification Test met the requirements set forth in Reference 2.

ATTACHMENT 3.3A

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 18:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.220 | 64.310 | 64.220 | 64.560 | 64.790 | 64.130 | 64.110 | 64.110 | 64.450 | 64.650 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.350 | 64.240 | 64.350 | 64.280 | 64.540 | 64.370 | 64.980 | 64.860 | 64.620 | 64.690 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.810 | 63.890 | 67.000 | 67.000 | 64.510 | 64.400 | 67.000 | 64.550 | 64.510 | 64.400 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.270 | 64.300 | 72.420 | 64.490 | 67.000 | 71.970 | 67.660 | 64.790 | 67.000 | 65.400 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.160 | 66.540 | 67.500 | 67.100 | 66.540 | 67.540 | 64.640 | 61.220 | 60.000 | 58.850 |
| C140 | C160 | | | | | | | | |
| 63.015 | 63.040 | | | | | | | | |

12/21/87 18:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.220 | 64.280 | 64.200 | 64.560 | 64.690 | 64.260 | 64.150 | 64.070 | 64.410 | 64.710 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.370 | 64.310 | 64.410 | 64.320 | 64.540 | 64.410 | 64.880 | 64.860 | 64.750 | 64.730 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.830 | 63.960 | 67.000 | 67.000 | 64.490 | 64.390 | 67.000 | 64.470 | 64.510 | 64.410 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.340 | 64.300 | 72.450 | 64.510 | 67.000 | 71.970 | 67.660 | 64.730 | 67.000 | 65.400 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.230 | 66.540 | 67.450 | 67.120 | 66.450 | 67.500 | 64.630 | 61.220 | 60.000 | 58.830 |
| C140 | C160 | | | | | | | | |
| 63.014 | 63.039 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 19:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.220 | 64.310 | 64.150 | 64.540 | 64.750 | 64.200 | 64.110 | 64.090 | 64.390 | 64.650 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.350 | 64.310 | 64.410 | 64.280 | 64.500 | 64.390 | 64.900 | 64.770 | 64.770 | 64.690 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.810 | 63.910 | 67.000 | 67.000 | 64.470 | 64.300 | 67.000 | 64.470 | 64.530 | 64.340 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.300 | 64.300 | 72.400 | 64.510 | 67.000 | 71.970 | 67.660 | 64.770 | 67.000 | 65.380 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.130 | 66.540 | 67.460 | 67.180 | 66.540 | 67.530 | 64.640 | 61.220 | 60.000 | 58.860 |
| C140 | C160 | | | | | | | | |
| 63.012 | 63.037 | | | | | | | | |

12/21/87 19:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.200 | 64.260 | 64.220 | 64.520 | 64.750 | 64.180 | 64.070 | 64.050 | 64.350 | 64.690 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.320 | 64.260 | 64.320 | 64.370 | 64.500 | 64.320 | 64.900 | 64.770 | 64.670 | 64.690 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.850 | 63.910 | 67.000 | 67.000 | 64.490 | 64.320 | 67.000 | 64.400 | 64.490 | 64.270 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.320 | 64.340 | 72.380 | 64.510 | 67.000 | 71.930 | 67.660 | 64.810 | 67.000 | 65.320 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.110 | 66.540 | 67.490 | 67.170 | 66.570 | 67.540 | 64.680 | 61.220 | 60.000 | 58.890 |
| C140 | C160 | | | | | | | | |
| 63.011 | 63.036 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 19:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.200 | 64.260 | 64.220 | 64.520 | 64.730 | 64.150 | 64.090 | 64.030 | 64.430 | 64.620 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.320 | 64.240 | 64.390 | 64.320 | 64.540 | 64.310 | 64.940 | 64.790 | 64.770 | 64.650 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.920 | 63.850 | 67.000 | 67.000 | 64.450 | 64.320 | 67.000 | 64.430 | 64.470 | 64.320 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.260 | 64.260 | 72.400 | 64.490 | 67.000 | 71.940 | 67.660 | 64.860 | 67.000 | 65.400 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.160 | 66.540 | 67.460 | 67.200 | 66.610 | 67.560 | 64.640 | 61.220 | 60.000 | 58.890 |
| C140 | C160 | | | | | | | | |
| 63.009 | 63.035 | | | | | | | | |

12/21/87 19:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.200 | 64.260 | 64.200 | 64.540 | 64.710 | 64.110 | 64.090 | 64.090 | 64.350 | 64.670 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.320 | 64.220 | 64.350 | 64.320 | 64.480 | 64.310 | 64.880 | 64.750 | 64.770 | 64.650 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.830 | 63.910 | 67.000 | 67.000 | 64.490 | 64.400 | 67.000 | 64.550 | 64.490 | 64.320 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.270 | 64.340 | 72.420 | 64.430 | 67.000 | 71.910 | 67.660 | 64.770 | 67.000 | 65.380 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.140 | 66.540 | 67.500 | 67.120 | 66.540 | 67.530 | 64.660 | 61.220 | 60.000 | 58.990 |
| C140 | C160 | | | | | | | | |
| 63.008 | 63.034 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 20:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.180 | 64.240 | 64.150 | 64.520 | 64.710 | 64.110 | 64.030 | 64.090 | 64.350 | 64.650 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.320 | 64.260 | 64.350 | 64.320 | 64.500 | 64.310 | 64.900 | 64.730 | 64.750 | 64.650 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.950 | 63.990 | 67.000 | 67.000 | 64.460 | 64.360 | 67.000 | 64.480 | 64.500 | 64.360 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.310 | 64.290 | 72.480 | 64.460 | 67.000 | 71.860 | 67.660 | 64.760 | 67.000 | 65.380 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.160 | 66.540 | 67.520 | 67.170 | 66.540 | 67.550 | 64.660 | 61.220 | 60.000 | 58.870 |
| C140 | C160 | | | | | | | | |
| 63.008 | 63.033 | | | | | | | | |

12/21/87 20:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.180 | 64.180 | 64.130 | 64.520 | 64.710 | 64.150 | 64.070 | 64.050 | 64.350 | 64.610 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.310 | 64.220 | 64.320 | 64.280 | 64.410 | 64.280 | 64.860 | 64.750 | 64.770 | 64.620 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.910 | 63.910 | 67.000 | 67.000 | 64.440 | 64.340 | 67.000 | 64.430 | 64.430 | 64.340 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.270 | 64.250 | 72.440 | 64.440 | 67.000 | 71.880 | 67.660 | 64.720 | 67.000 | 65.360 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.230 | 66.540 | 67.490 | 67.150 | 66.580 | 67.580 | 64.670 | 61.220 | 60.000 | 58.940 |
| C140 | C160 | | | | | | | | |
| 63.006 | 63.031 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 20:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.180 | 64.200 | 64.150 | 64.480 | 64.670 | 64.110 | 64.030 | 64.030 | 64.410 | 64.580 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.280 | 64.260 | 64.280 | 64.260 | 64.430 | 64.260 | 64.840 | 64.690 | 64.710 | 64.650 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.830 | 63.780 | 67.000 | 67.000 | 64.470 | 64.300 | 67.000 | 64.430 | 64.440 | 64.340 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.230 | 64.320 | 72.440 | 64.440 | 67.000 | 71.890 | 67.660 | 64.700 | 67.000 | 65.320 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.230 | 66.540 | 67.540 | 67.180 | 66.590 | 67.590 | 64.690 | 61.220 | 60.000 | 58.970 |
| C140 | C160 | | | | | | | | |
| 63.004 | 63.030 | | | | | | | | |

12/21/87 20:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.130 | 64.240 | 64.150 | 64.480 | 64.730 | 64.070 | 64.010 | 63.980 | 64.280 | 64.610 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.280 | 64.220 | 64.180 | 64.240 | 64.450 | 64.310 | 64.860 | 64.690 | 64.670 | 64.610 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.910 | 63.850 | 67.000 | 67.000 | 64.470 | 64.300 | 67.000 | 64.440 | 64.440 | 64.340 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.210 | 64.210 | 72.440 | 64.440 | 67.000 | 71.850 | 67.660 | 64.740 | 67.000 | 65.340 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.150 | 66.540 | 67.550 | 67.190 | 66.610 | 67.580 | 64.670 | 61.220 | 60.000 | 58.930 |
| C140 | C160 | | | | | | | | |
| 63.002 | 63.029 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 21:00

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 64.090 | 64.180 | 64.130 | 64.500 | 64.730 | 64.130 | 64.090 | 64.030 | 64.370 | 64.610 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.280 | 64.200 | 64.260 | 64.260 | 64.390 | 64.180 | 64.920 | 64.690 | 64.770 | 64.580 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.830 | 63.810 | 67.000 | 67.000 | 64.430 | 64.320 | 67.000 | 64.270 | 64.470 | 64.270 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.230 | 64.270 | 72.470 | 64.400 | 67.000 | 71.920 | 67.660 | 64.700 | 67.000 | 65.330 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.210 | 66.540 | 67.530 | 67.160 | 66.610 | 67.560 | 64.690 | 61.220 | 60.000 | 58.980 |
| C140 | C160 | | | | | | | | |
| 63.002 | 63.028 | | | | | | | | |

12/21/87 21:15

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 64.150 | 64.150 | 64.130 | 64.450 | 64.670 | 64.090 | 64.030 | 63.960 | 64.320 | 64.650 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.280 | 64.240 | 64.220 | 64.240 | 64.430 | 64.260 | 64.880 | 64.690 | 64.690 | 64.670 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.830 | 63.870 | 67.000 | 67.000 | 64.430 | 64.300 | 67.000 | 64.360 | 64.430 | 64.340 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.210 | 64.250 | 72.420 | 64.430 | 67.000 | 71.880 | 67.660 | 64.770 | 67.000 | 65.330 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.190 | 66.540 | 67.540 | 67.190 | 66.530 | 67.580 | 64.700 | 61.220 | 60.000 | 58.920 |
| C140 | C160 | | | | | | | | |
| 63.001 | 63.026 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 21:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.150 | 64.200 | 64.110 | 64.450 | 64.690 | 64.050 | 64.010 | 63.960 | 64.280 | 64.580 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.240 | 64.200 | 64.200 | 64.220 | 64.430 | 64.220 | 64.810 | 64.670 | 64.620 | 64.560 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.850 | 63.870 | 67.000 | 67.000 | 64.430 | 64.250 | 67.000 | 64.380 | 64.430 | 64.320 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.210 | 64.300 | 72.420 | 64.380 | 67.000 | 71.930 | 67.060 | 64.700 | 67.000 | 65.340 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.180 | 66.540 | 67.550 | 67.240 | 66.620 | 67.520 | 64.690 | 61.220 | 60.000 | 58.940 |
| C140 | C160 | | | | | | | | |
| 63.000 | 63.025 | | | | | | | | |

12/21/87 21:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.110 | 64.180 | 64.090 | 64.430 | 64.650 | 64.090 | 63.980 | 63.960 | 64.280 | 64.610 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.240 | 64.200 | 64.220 | 64.260 | 64.390 | 64.280 | 64.790 | 64.620 | 64.580 | 64.560 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.830 | 63.870 | 67.000 | 67.000 | 64.430 | 64.230 | 67.000 | 64.360 | 64.430 | 64.250 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.130 | 64.190 | 72.420 | 64.400 | 67.000 | 71.780 | 67.060 | 64.700 | 67.000 | 65.230 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.220 | 66.540 | 67.560 | 67.230 | 66.580 | 67.650 | 64.730 | 61.220 | 60.000 | 58.970 |
| C140 | C160 | | | | | | | | |
| 62.999 | 63.024 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 22:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.150 | 64.150 | 64.110 | 64.450 | 64.690 | 64.050 | 64.010 | 63.960 | 64.350 | 64.540 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.220 | 64.220 | 64.280 | 64.240 | 64.410 | 64.220 | 64.840 | 64.670 | 64.620 | 64.620 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.740 | 63.850 | 67.000 | 67.000 | 64.400 | 64.270 | 67.000 | 64.470 | 64.400 | 64.230 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.190 | 64.190 | 72.300 | 64.400 | 67.000 | 71.910 | 67.060 | 64.640 | 67.000 | 65.270 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.220 | 66.540 | 67.550 | 67.220 | 66.680 | 67.520 | 64.730 | 61.220 | 60.000 | 58.910 |
| C140 | C160 | | | | | | | | |
| 62.997 | 63.023 | | | | | | | | |

12/21/87 22:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.090 | 64.180 | 64.110 | 64.430 | 64.650 | 64.030 | 63.960 | 63.940 | 64.280 | 64.560 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.200 | 64.200 | 64.150 | 64.260 | 64.410 | 64.260 | 64.810 | 64.620 | 64.540 | 64.560 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.700 | 63.810 | 67.000 | 67.000 | 64.380 | 64.250 | 67.000 | 64.470 | 64.430 | 64.300 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.190 | 64.230 | 72.250 | 64.380 | 67.000 | 71.730 | 67.060 | 64.640 | 67.000 | 65.250 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.140 | 66.540 | 67.640 | 67.220 | 66.660 | 67.610 | 64.730 | 61.220 | 60.000 | 58.970 |
| C140 | C160 | | | | | | | | |
| 62.996 | 63.021 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 22:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.110 | 64.180 | 64.110 | 64.410 | 64.650 | 64.100 | 63.990 | 63.900 | 64.310 | 64.520 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.200 | 64.160 | 64.270 | 64.200 | 64.390 | 64.270 | 64.840 | 64.670 | 64.580 | 64.560 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.620 | 63.850 | 67.000 | 67.000 | 64.360 | 64.210 | 67.000 | 64.470 | 64.430 | 64.250 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.110 | 64.210 | 72.120 | 64.380 | 67.000 | 71.740 | 67.060 | 64.660 | 67.000 | 65.230 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.270 | 66.540 | 67.550 | 67.270 | 66.620 | 67.660 | 64.770 | 61.220 | 60.000 | 58.930 |
| C140 | C160 | | | | | | | | |
| 62.996 | 63.020 | | | | | | | | |

12/21/87 22:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.110 | 64.100 | 64.050 | 64.410 | 64.610 | 64.050 | 63.990 | 63.970 | 64.290 | 64.520 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.200 | 64.160 | 64.140 | 64.110 | 64.370 | 64.180 | 64.760 | 64.730 | 64.580 | 64.540 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.510 | 64.000 | 67.000 | 67.000 | 64.400 | 64.270 | 67.000 | 64.320 | 64.440 | 64.250 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.130 | 64.250 | 71.700 | 64.340 | 67.000 | 71.860 | 67.060 | 64.550 | 67.000 | 65.230 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.240 | 66.540 | 67.590 | 67.230 | 66.590 | 67.600 | 64.740 | 61.220 | 60.000 | 58.960 |
| C140 | C160 | | | | | | | | |
| 62.994 | 63.019 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 23:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.110 | 64.150 | 64.090 | 64.390 | 64.670 | 64.050 | 63.980 | 64.010 | 64.350 | 64.480 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.220 | 64.150 | 64.180 | 64.200 | 64.320 | 64.200 | 64.880 | 64.690 | 64.560 | 64.560 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.680 | 63.850 | 67.000 | 67.000 | 64.380 | 64.250 | 67.000 | 64.300 | 64.430 | 64.270 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.210 | 64.210 | 72.190 | 64.340 | 67.000 | 71.590 | 67.060 | 64.640 | 67.000 | 65.300 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.230 | 66.540 | 67.620 | 67.220 | 66.730 | 67.670 | 64.790 | 61.220 | 60.000 | 59.040 |
| C140 | C160 | | | | | | | | |
| 62.994 | 63.018 | | | | | | | | |

12/21/87 23:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.090 | 64.150 | 64.050 | 64.390 | 64.580 | 64.030 | 63.920 | 63.940 | 64.280 | 64.500 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.200 | 64.150 | 64.180 | 64.180 | 64.370 | 64.220 | 64.770 | 64.620 | 64.650 | 64.540 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.830 | 63.850 | 67.000 | 67.000 | 64.360 | 64.220 | 67.000 | 64.320 | 64.390 | 64.260 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.150 | 64.190 | 72.360 | 64.340 | 67.000 | 71.740 | 67.060 | 64.620 | 67.000 | 65.270 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.250 | 66.540 | 67.590 | 67.290 | 66.790 | 67.670 | 64.770 | 61.220 | 60.000 | 58.960 |
| C140 | C160 | | | | | | | | |
| 62.992 | 63.016 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/21/87 23:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.070 | 64.150 | 64.070 | 64.370 | 64.620 | 64.030 | 63.920 | 63.920 | 64.260 | 64.480 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.220 | 64.150 | 64.200 | 64.180 | 64.370 | 64.200 | 64.790 | 64.580 | 64.620 | 64.540 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.810 | 63.850 | 67.000 | 67.000 | 64.380 | 64.230 | 67.000 | 64.320 | 64.340 | 64.230 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.170 | 64.170 | 72.340 | 64.340 | 67.000 | 71.820 | 67.060 | 64.600 | 67.000 | 65.250 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.230 | 66.540 | 67.610 | 67.260 | 66.680 | 67.620 | 64.810 | 61.220 | 60.000 | 58.960 |
| C140 | C160 | | | | | | | | |
| 62.991 | 63.015 | | | | | | | | |

12/21/87 23:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.100 | 64.160 | 64.070 | 64.410 | 64.650 | 64.050 | 64.010 | 63.970 | 64.330 | 64.480 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.240 | 64.140 | 64.220 | 64.240 | 64.370 | 64.110 | 64.770 | 64.760 | 64.610 | 64.540 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.700 | 63.720 | 67.000 | 67.000 | 64.360 | 64.210 | 67.000 | 64.270 | 64.340 | 64.190 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.170 | 64.170 | 72.270 | 64.270 | 67.000 | 71.850 | 67.060 | 64.640 | 67.000 | 65.270 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.230 | 66.540 | 67.550 | 67.260 | 66.690 | 67.520 | 64.750 | 61.220 | 60.000 | 58.960 |
| C140 | C160 | | | | | | | | |
| 62.990 | 63.014 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 00:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.070 | 64.150 | 64.070 | 64.390 | 64.540 | 64.030 | 63.980 | 63.940 | 64.260 | 64.560 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.200 | 64.150 | 64.180 | 64.180 | 64.350 | 64.200 | 64.810 | 64.620 | 64.450 | 64.520 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.740 | 63.850 | 67.000 | 67.000 | 64.340 | 64.210 | 67.000 | 64.340 | 64.380 | 64.210 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.110 | 64.210 | 72.190 | 64.300 | 67.000 | 71.860 | 67.060 | 64.640 | 67.000 | 65.190 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.210 | 66.540 | 67.590 | 67.260 | 66.630 | 67.700 | 64.810 | 61.220 | 60.000 | 58.970 |
| C140 | C160 | | | | | | | | |
| 62.989 | 63.013 | | | | | | | | |

12/22/87 00:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.050 | 64.070 | 64.050 | 64.390 | 64.650 | 64.090 | 63.980 | 63.920 | 64.280 | 64.540 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.220 | 64.110 | 64.220 | 64.200 | 64.320 | 64.220 | 64.730 | 64.730 | 64.610 | 64.500 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.900 | 63.850 | 67.000 | 67.000 | 64.270 | 64.190 | 67.000 | 64.380 | 64.400 | 64.250 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.130 | 64.130 | 72.310 | 64.320 | 67.000 | 71.780 | 67.060 | 64.600 | 67.000 | 65.270 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.260 | 66.540 | 67.600 | 67.300 | 66.670 | 67.680 | 64.800 | 61.220 | 60.000 | 59.010 |
| C140 | C160 | | | | | | | | |
| 62.988 | 63.012 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 00:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.050 | 64.110 | 64.050 | 64.370 | 64.580 | 64.010 | 63.900 | 63.920 | 64.220 | 64.500 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.180 | 64.130 | 64.220 | 64.180 | 64.320 | 64.220 | 64.710 | 64.610 | 64.500 | 64.540 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.640 | 63.810 | 67.000 | 67.000 | 64.360 | 64.210 | 67.000 | 64.250 | 64.340 | 64.190 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.110 | 64.230 | 72.190 | 64.300 | 67.000 | 71.740 | 67.060 | 64.600 | 67.000 | 65.230 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.240 | 66.540 | 67.630 | 67.270 | 66.690 | 67.670 | 64.820 | 61.220 | 60.000 | 58.980 |
| C140 | C160 | | | | | | | | |
| 62.988 | 63.011 | | | | | | | | |

12/22/87 00:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.090 | 64.130 | 64.030 | 64.390 | 64.580 | 64.030 | 63.920 | 63.920 | 64.310 | 64.610 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.150 | 64.110 | 64.130 | 64.200 | 64.320 | 64.220 | 64.690 | 64.650 | 64.450 | 64.500 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.700 | 63.740 | 67.000 | 67.000 | 64.320 | 64.150 | 67.000 | 64.320 | 64.360 | 64.210 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.020 | 64.190 | 72.230 | 64.300 | 67.000 | 71.730 | 67.060 | 64.640 | 67.000 | 65.200 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.330 | 66.540 | 67.570 | 67.310 | 66.560 | 67.700 | 64.790 | 61.220 | 60.000 | 58.960 |
| C140 | C160 | | | | | | | | |
| 62.987 | 63.010 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 01:00

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 64.070 | 64.130 | 64.050 | 64.350 | 64.610 | 64.050 | 63.960 | 63.900 | 64.220 | 64.520 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.150 | 64.130 | 64.220 | 64.110 | 64.370 | 64.200 | 64.710 | 64.560 | 64.450 | 64.500 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.770 | 63.890 | 67.000 | 67.000 | 64.340 | 64.150 | 67.000 | 64.270 | 64.340 | 64.210 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.110 | 64.150 | 72.310 | 64.300 | 67.000 | 71.690 | 67.060 | 64.640 | 67.000 | 65.210 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.240 | 66.540 | 67.560 | 67.330 | 66.640 | 67.620 | 64.840 | 61.220 | 60.000 | 58.980 |
| C140 | C160 | | | | | | | | |
| 62.986 | 63.009 | | | | | | | | |

12/22/87 01:15

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 64.030 | 63.960 | 64.030 | 64.370 | 64.580 | 64.030 | 63.920 | 63.920 | 64.200 | 64.450 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.180 | 64.090 | 64.200 | 64.130 | 64.320 | 64.150 | 64.730 | 64.580 | 64.620 | 64.560 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.740 | 63.720 | 67.000 | 67.000 | 64.340 | 64.210 | 67.000 | 64.360 | 64.380 | 64.170 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.130 | 64.190 | 72.310 | 64.270 | 67.000 | 71.770 | 67.060 | 64.620 | 67.000 | 65.250 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.310 | 66.540 | 67.580 | 67.290 | 66.720 | 67.710 | 64.830 | 61.220 | 60.000 | 58.970 |
| C140 | C160 | | | | | | | | |
| 62.986 | 63.009 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 01:30

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 64.070 | 64.110 | 64.050 | 64.370 | 64.560 | 64.030 | 63.940 | 63.920 | 64.220 | 64.520 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.180 | 64.090 | 64.110 | 64.150 | 64.350 | 64.150 | 64.730 | 64.580 | 64.580 | 64.480 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.740 | 63.770 | 67.000 | 67.000 | 64.340 | 64.210 | 67.000 | 64.230 | 64.320 | 64.230 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.150 | 64.170 | 72.310 | 64.300 | 67.000 | 71.740 | 67.060 | 64.570 | 67.000 | 65.230 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.310 | 66.540 | 67.580 | 67.310 | 66.710 | 67.670 | 64.840 | 61.220 | 60.000 | 59.000 |
| C140 | C160 | | | | | | | | |
| 62.986 | 63.007 | | | | | | | | |

12/22/87 01:45

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 64.050 | 64.070 | 64.030 | 64.350 | 64.560 | 63.960 | 63.900 | 63.920 | 64.240 | 64.500 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.110 | 64.090 | 64.130 | 64.110 | 64.320 | 64.090 | 64.730 | 64.540 | 64.410 | 64.480 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.770 | 63.770 | 67.000 | 67.000 | 64.320 | 64.130 | 67.000 | 64.430 | 64.320 | 64.270 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.110 | 64.150 | 72.300 | 64.270 | 67.000 | 71.760 | 67.060 | 64.600 | 67.000 | 65.230 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.300 | 66.540 | 67.620 | 67.340 | 66.760 | 67.780 | 64.850 | 61.220 | 60.000 | 59.050 |
| C140 | C160 | | | | | | | | |
| 62.985 | 63.006 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 02:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.050 | 64.110 | 64.010 | 64.320 | 64.540 | 64.030 | 63.920 | 63.880 | 64.240 | 64.500 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.110 | 64.070 | 64.130 | 64.180 | 64.320 | 64.180 | 64.670 | 64.610 | 64.480 | 64.450 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.810 | 63.700 | 67.000 | 67.000 | 64.320 | 64.150 | 67.000 | 64.230 | 64.340 | 64.130 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.040 | 64.150 | 72.310 | 64.270 | 67.000 | 71.780 | 67.060 | 64.620 | 67.000 | 65.150 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.250 | 66.540 | 67.630 | 67.290 | 66.730 | 67.730 | 64.870 | 61.220 | 60.000 | 59.070 |
| C140 | C160 | | | | | | | | |
| 62.984 | 63.005 | | | | | | | | |

12/22/87 02:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.030 | 64.110 | 64.010 | 64.310 | 64.580 | 64.050 | 63.900 | 63.840 | 64.220 | 64.500 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.070 | 64.100 | 64.180 | 64.160 | 64.330 | 64.200 | 64.730 | 64.580 | 64.460 | 64.460 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.740 | 63.740 | 67.000 | 67.000 | 64.320 | 64.110 | 67.000 | 64.360 | 64.340 | 64.150 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.040 | 64.190 | 72.250 | 64.250 | 67.000 | 71.740 | 67.060 | 64.570 | 67.000 | 65.080 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.270 | 66.540 | 67.580 | 67.360 | 66.650 | 67.660 | 64.930 | 61.220 | 60.000 | 59.040 |
| C140 | C160 | | | | | | | | |
| 62.984 | 63.005 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 02:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.050 | 64.090 | 63.980 | 64.320 | 64.560 | 64.010 | 63.920 | 63.860 | 64.260 | 64.580 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.090 | 64.070 | 64.030 | 64.090 | 64.310 | 64.180 | 64.690 | 64.500 | 64.430 | 64.410 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.660 | 63.680 | 67.000 | 67.000 | 64.340 | 64.080 | 67.000 | 64.320 | 64.360 | 64.130 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.110 | 64.130 | 72.210 | 64.270 | 67.000 | 71.720 | 67.060 | 64.600 | 67.000 | 65.150 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.270 | 66.540 | 67.620 | 67.350 | 66.620 | 67.750 | 64.890 | 61.220 | 60.000 | 59.010 |
| C140 | C160 | | | | | | | | |
| 62.983 | 63.004 | | | | | | | | |

12/22/87 02:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.050 | 64.070 | 64.010 | 64.320 | 64.610 | 64.030 | 63.940 | 63.860 | 64.260 | 64.480 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.070 | 64.110 | 64.150 | 64.110 | 64.310 | 64.150 | 64.810 | 64.580 | 64.430 | 64.430 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.570 | 63.770 | 67.000 | 67.000 | 64.320 | 64.110 | 67.000 | 64.380 | 64.340 | 64.130 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.000 | 64.150 | 72.140 | 64.270 | 67.000 | 71.690 | 67.060 | 64.620 | 67.000 | 65.160 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.270 | 66.540 | 67.620 | 67.370 | 66.760 | 67.700 | 64.880 | 61.220 | 60.000 | 58.970 |
| C140 | C160 | | | | | | | | |
| 62.982 | 63.004 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 03:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.030 | 64.130 | 64.010 | 64.320 | 64.580 | 64.010 | 63.900 | 63.860 | 64.180 | 64.500 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.110 | 64.070 | 64.180 | 64.070 | 64.310 | 64.110 | 64.690 | 64.520 | 64.390 | 64.480 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.720 | 63.830 | 67.000 | 67.000 | 64.320 | 64.170 | 67.000 | 64.270 | 64.360 | 64.230 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.020 | 64.080 | 72.300 | 64.270 | 67.000 | 71.690 | 67.060 | 64.620 | 67.000 | 65.110 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.260 | 66.540 | 67.600 | 67.350 | 66.690 | 67.730 | 64.900 | 61.220 | 60.000 | 58.980 |
| C140 | C160 | | | | | | | | |
| 62.981 | 63.002 | | | | | | | | |

12/22/87 03:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.050 | 64.070 | 64.030 | 64.320 | 64.520 | 63.960 | 63.840 | 63.840 | 64.130 | 64.450 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.090 | 64.070 | 63.980 | 64.050 | 64.260 | 64.130 | 64.540 | 64.580 | 64.500 | 64.450 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.660 | 63.660 | 67.000 | 67.000 | 64.320 | 64.150 | 67.000 | 64.320 | 64.320 | 64.130 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.080 | 64.130 | 72.230 | 64.230 | 67.000 | 71.640 | 67.060 | 64.530 | 67.000 | 65.120 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.290 | 66.540 | 67.610 | 67.320 | 66.740 | 67.770 | 64.900 | 61.220 | 60.000 | 59.100 |
| C140 | C160 | | | | | | | | |
| 62.979 | 63.001 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 03:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.030 | 64.050 | 64.010 | 64.320 | 64.580 | 63.940 | 63.880 | 63.840 | 64.180 | 64.410 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.090 | 64.090 | 64.130 | 64.130 | 64.320 | 64.130 | 64.670 | 64.580 | 64.480 | 64.480 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.720 | 63.680 | 67.000 | 67.000 | 64.300 | 64.130 | 67.000 | 64.250 | 64.320 | 64.150 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.150 | 64.130 | 72.250 | 64.230 | 67.000 | 71.690 | 67.060 | 64.530 | 67.000 | 65.150 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.350 | 66.540 | 67.660 | 67.360 | 66.710 | 67.690 | 64.900 | 61.220 | 60.000 | 59.110 |
| C140 | C160 | | | | | | | | |
| 62.978 | 63.000 | | | | | | | | |

12/22/87 03:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.030 | 64.050 | 64.010 | 64.320 | 64.540 | 64.030 | 63.860 | 63.840 | 64.200 | 64.480 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.090 | 64.090 | 64.090 | 64.110 | 64.280 | 64.150 | 64.620 | 64.580 | 64.540 | 64.450 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.720 | 63.810 | 67.000 | 67.000 | 64.300 | 64.110 | 67.000 | 64.210 | 64.320 | 64.130 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.060 | 64.130 | 72.210 | 64.230 | 67.000 | 71.670 | 67.060 | 64.600 | 67.000 | 65.150 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.250 | 66.540 | 67.630 | 67.370 | 66.720 | 67.690 | 64.890 | 61.220 | 60.000 | 59.050 |
| C140 | C160 | | | | | | | | |
| 62.978 | 62.999 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 04:00

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 64.030 | 64.070 | 63.970 | 64.310 | 64.520 | 63.940 | 63.820 | 63.840 | 64.160 | 64.460 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.070 | 64.050 | 64.100 | 64.100 | 64.290 | 64.110 | 64.630 | 64.500 | 64.500 | 64.440 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.570 | 63.700 | 67.000 | 67.000 | 64.320 | 64.080 | 67.000 | 64.210 | 64.320 | 64.150 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.060 | 64.150 | 72.140 | 64.210 | 67.000 | 71.740 | 67.060 | 64.570 | 67.000 | 65.130 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.300 | 66.540 | 67.690 | 67.380 | 66.760 | 67.720 | 64.900 | 61.220 | 60.000 | 59.000 |
| C140 | C160 | | | | | | | | |
| 62.977 | 62.999 | | | | | | | | |

12/22/87 04:15

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 64.030 | 64.070 | 63.980 | 64.310 | 64.520 | 63.940 | 63.880 | 63.840 | 64.260 | 64.450 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.070 | 64.070 | 64.090 | 64.070 | 64.280 | 64.090 | 64.670 | 64.520 | 64.390 | 64.430 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.640 | 63.720 | 67.000 | 67.000 | 64.270 | 64.080 | 67.000 | 64.340 | 64.360 | 64.080 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.980 | 64.060 | 72.140 | 64.270 | 67.000 | 71.720 | 67.060 | 64.490 | 67.000 | 65.110 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.240 | 66.540 | 67.600 | 67.400 | 66.730 | 67.640 | 64.900 | 61.220 | 60.000 | 59.110 |
| C140 | C160 | | | | | | | | |
| 62.976 | 62.999 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 04:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.960 | 64.050 | 63.960 | 64.310 | 64.520 | 63.960 | 63.840 | 63.840 | 64.150 | 64.500 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.110 | 64.110 | 64.090 | 64.070 | 64.310 | 64.130 | 64.650 | 64.520 | 64.430 | 64.500 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.660 | 63.770 | 67.000 | 67.000 | 64.250 | 64.150 | 67.000 | 64.270 | 64.300 | 64.110 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.060 | 64.060 | 72.210 | 64.210 | 67.000 | 71.720 | 67.060 | 64.530 | 67.000 | 65.110 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.210 | 66.540 | 67.660 | 67.320 | 66.680 | 67.680 | 64.880 | 61.220 | 60.000 | 59.070 |
| C140 | C160 | | | | | | | | |
| 62.975 | 62.998 | | | | | | | | |

12/22/87 04:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.990 | 64.050 | 63.990 | 64.290 | 64.480 | 63.920 | 63.820 | 63.840 | 64.180 | 64.440 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.050 | 64.030 | 64.070 | 64.070 | 64.270 | 64.140 | 64.670 | 64.520 | 64.410 | 64.410 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.740 | 63.740 | 67.000 | 67.000 | 64.320 | 64.130 | 67.000 | 64.360 | 64.270 | 64.170 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.020 | 64.110 | 72.250 | 64.230 | 67.000 | 71.720 | 67.060 | 64.570 | 67.000 | 65.130 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.200 | 66.540 | 67.650 | 67.330 | 66.630 | 67.760 | 64.930 | 61.220 | 60.000 | 59.020 |
| C140 | C160 | | | | | | | | |
| 62.974 | 62.997 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 05:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.980 | 64.070 | 63.960 | 64.280 | 64.500 | 63.940 | 63.840 | 63.820 | 64.200 | 64.450 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.070 | 64.050 | 64.050 | 64.050 | 64.260 | 64.070 | 64.620 | 64.520 | 64.370 | 64.410 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.570 | 63.720 | 67.000 | 67.000 | 64.270 | 64.080 | 67.000 | 64.320 | 64.340 | 64.080 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.020 | 64.110 | 72.080 | 64.230 | 67.000 | 71.690 | 67.060 | 64.550 | 67.000 | 65.100 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.280 | 66.540 | 67.630 | 67.370 | 66.730 | 67.790 | 64.890 | 61.220 | 60.000 | 59.020 |
| C140 | C160 | | | | | | | | |
| 62.973 | 62.996 | | | | | | | | |

12/22/87 05:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.050 | 64.090 | 63.980 | 64.260 | 64.500 | 63.960 | 63.840 | 63.790 | 64.180 | 64.430 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.050 | 64.070 | 63.980 | 64.070 | 64.240 | 64.130 | 64.670 | 64.540 | 64.410 | 64.450 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.590 | 63.760 | 67.000 | 67.000 | 64.310 | 64.140 | 67.000 | 64.230 | 64.290 | 64.140 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.990 | 64.080 | 72.100 | 64.230 | 67.000 | 71.760 | 67.060 | 64.630 | 67.000 | 65.110 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.240 | 66.540 | 67.590 | 67.350 | 66.830 | 67.780 | 64.930 | 61.220 | 60.000 | 59.030 |
| C140 | C160 | | | | | | | | |
| 62.972 | 62.995 | | | | | | | | |

**ATTACHMENT 3.3A (Cont.)**

**INDIAN POINT 2 1987**
**FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87**

**ILRT MEASURED INPUT DATA**

12/22/87 05:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.010 | 64.030 | 63.980 | 64.280 | 64.520 | 63.960 | 63.820 | 63.820 | 64.220 | 64.450 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.070 | 64.030 | 63.980 | 64.070 | 64.260 | 64.090 | 64.620 | 64.500 | 64.430 | 64.450 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.680 | 63.780 | 67.000 | 67.000 | 64.270 | 64.110 | 67.000 | 64.300 | 64.300 | 64.130 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.060 | 64.020 | 72.210 | 64.210 | 67.000 | 71.560 | 67.060 | 64.470 | 67.000 | 65.080 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.190 | 66.540 | 67.650 | 67.330 | 66.730 | 67.790 | 64.930 | 61.220 | 60.000 | 59.060 |
| C140 | C160 | | | | | | | | |
| 62.972 | 62.995 | | | | | | | | |

12/22/87 05:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 64.010 | 64.030 | 63.940 | 64.280 | 64.520 | 63.920 | 63.820 | 63.820 | 64.130 | 64.430 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.090 | 64.010 | 64.050 | 64.050 | 64.200 | 64.110 | 64.620 | 64.520 | 64.450 | 64.370 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.680 | 63.740 | 67.000 | 67.000 | 64.270 | 64.130 | 67.000 | 64.300 | 64.300 | 64.080 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.000 | 64.060 | 72.190 | 64.170 | 67.000 | 71.630 | 67.060 | 64.510 | 67.000 | 65.110 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.320 | 66.540 | 67.660 | 67.360 | 66.730 | 67.800 | 64.930 | 61.220 | 60.000 | 59.040 |
| C140 | C160 | | | | | | | | |
| 62.971 | 62.994 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 06:00

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.980 | 64.030 | 63.900 | 64.240 | 64.520 | 63.960 | 63.840 | 63.790 | 64.150 | 64.410 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.030 | 64.010 | 63.960 | 63.980 | 64.260 | 64.110 | 64.670 | 64.480 | 64.450 | 64.390 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.660 | 63.700 | 67.000 | 67.000 | 64.280 | 64.090 | 67.000 | 64.340 | 64.260 | 64.130 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.980 | 64.020 | 72.170 | 64.190 | 67.000 | 71.630 | 67.060 | 64.470 | 67.000 | 65.080 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.270 | 66.540 | 67.680 | 67.340 | 66.760 | 67.820 | 64.930 | 61.220 | 60.000 | 59.080 |
| C140 | C160 | | | | | | | | |
| 62.971 | 62.993 | | | | | | | | |

12/22/87 06:15

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.980 | 64.010 | 63.940 | 64.260 | 64.540 | 63.900 | 63.790 | 63.790 | 64.130 | 64.430 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.030 | 64.010 | 63.960 | 64.050 | 64.220 | 64.090 | 64.560 | 64.500 | 64.430 | 64.390 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.720 | 63.660 | 67.000 | 67.000 | 64.270 | 64.110 | 67.000 | 64.190 | 64.250 | 64.060 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.980 | 64.080 | 72.190 | 64.210 | 67.000 | 71.610 | 67.060 | 64.440 | 67.000 | 65.060 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.230 | 66.540 | 67.650 | 67.370 | 66.760 | 67.840 | 64.940 | 61.220 | 60.000 | 59.090 |
| C140 | C160 | | | | | | | | |
| 62.970 | 62.992 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 06:30

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.940 | 64.010 | 63.920 | 64.240 | 64.520 | 63.920 | 63.840 | 63.840 | 64.140 | 64.390 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.030 | 64.030 | 63.970 | 64.050 | 64.240 | 64.140 | 64.650 | 64.460 | 64.370 | 64.370 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.740 | 63.700 | 67.000 | 67.000 | 64.250 | 64.080 | 67.000 | 64.190 | 64.270 | 64.150 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.980 | 64.080 | 72.210 | 64.170 | 67.000 | 71.590 | 67.060 | 64.530 | 67.000 | 65.080 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.280 | 66.540 | 67.660 | 67.360 | 66.790 | 67.770 | 64.920 | 61.220 | 60.000 | 59.140 |
| C140 | C160 | | | | | | | | |
| 62.969 | 62.992 | | | | | | | | |

12/22/87 06:45

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.980 | 64.030 | 63.920 | 64.260 | 64.520 | 63.940 | 63.820 | 63.770 | 64.130 | 64.450 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.050 | 64.050 | 63.960 | 64.050 | 64.220 | 64.070 | 64.690 | 64.480 | 64.280 | 64.370 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.740 | 63.720 | 67.000 | 67.000 | 64.230 | 64.020 | 67.000 | 64.300 | 64.270 | 64.130 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 64.060 | 72.190 | 64.210 | 67.000 | 71.590 | 67.060 | 64.490 | 67.000 | 65.080 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.300 | 66.540 | 67.600 | 67.400 | 66.720 | 67.790 | 64.940 | 61.220 | 60.000 | 59.150 |
| C140 | C160 | | | | | | | | |
| 62.969 | 62.991 | | | | | | | | |

**ATTACHMENT 3.3A (Cont.)**

**INDIAN POINT 2 1987**
**FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87**

**ILRT MEASURED INPUT DATA**

12/22/87 07:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.980 | 64.010 | 63.920 | 64.260 | 64.500 | 63.920 | 63.790 | 63.840 | 64.180 | 64.390 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.050 | 64.010 | 64.050 | 64.070 | 64.220 | 64.050 | 64.670 | 64.480 | 64.390 | 64.370 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.700 | 63.750 | 67.000 | 67.000 | 64.230 | 64.040 | 67.000 | 64.320 | 64.280 | 64.070 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.000 | 64.020 | 72.170 | 64.170 | 67.000 | 71.600 | 67.060 | 64.560 | 67.000 | 65.030 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.320 | 66.540 | 67.620 | 67.420 | 66.760 | 67.770 | 64.940 | 61.220 | 60.000 | 59.090 |
| C140 | C160 | | | | | | | | |
| 62.967 | 62.990 | | | | | | | | |

12/22/87 07:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.920 | 64.010 | 63.920 | 64.240 | 64.460 | 63.970 | 63.820 | 63.750 | 64.160 | 64.440 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.030 | 64.030 | 64.010 | 64.030 | 64.240 | 64.070 | 64.580 | 64.460 | 64.480 | 64.390 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.700 | 63.740 | 67.000 | 67.000 | 64.210 | 64.020 | 67.000 | 64.250 | 64.250 | 64.130 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.020 | 63.960 | 72.190 | 64.170 | 67.000 | 71.630 | 67.060 | 64.510 | 67.000 | 65.060 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.350 | 66.540 | 67.660 | 67.430 | 66.790 | 67.860 | 64.960 | 61.220 | 60.000 | 59.170 |
| C140 | C160 | | | | | | | | |
| 62.967 | 62.990 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 07:30

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.960 | 63.980 | 63.920 | 64.240 | 64.480 | 63.880 | 63.770 | 63.820 | 64.130 | 64.390 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.030 | 64.030 | 64.050 | 64.030 | 64.200 | 64.070 | 64.610 | 64.480 | 64.450 | 64.410 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.700 | 63.640 | 67.000 | 67.000 | 64.230 | 64.040 | 67.000 | 64.230 | 64.210 | 64.060 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 63.980 | 72.170 | 64.130 | 67.000 | 71.630 | 67.060 | 64.440 | 67.000 | 65.110 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.300 | 66.540 | 67.700 | 67.370 | 66.730 | 67.760 | 64.940 | 61.220 | 60.000 | 59.090 |
| C140 | C160 | | | | | | | | |
| 62.967 | 62.989 | | | | | | | | |

12/22/87 07:45

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.940 | 63.960 | 63.860 | 64.260 | 64.430 | 63.920 | 63.770 | 63.750 | 64.090 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.030 | 64.030 | 64.050 | 64.050 | 64.220 | 64.070 | 64.610 | 64.500 | 64.350 | 64.390 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.660 | 63.700 | 67.000 | 67.000 | 64.220 | 64.070 | 67.000 | 64.230 | 64.260 | 64.110 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.020 | 64.070 | 72.170 | 64.170 | 67.000 | 71.640 | 67.060 | 64.490 | 67.000 | 65.030 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.330 | 66.540 | 67.670 | 67.370 | 66.800 | 67.760 | 64.910 | 61.220 | 60.000 | 59.050 |
| C140 | C160 | | | | | | | | |
| 62.966 | 62.988 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 08:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.940 | 63.940 | 63.880 | 64.240 | 64.390 | 63.840 | 63.750 | 63.750 | 64.130 | 64.310 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 64.010 | 64.090 | 63.980 | 64.180 | 64.030 | 64.580 | 64.410 | 64.390 | 64.370 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.680 | 63.680 | 67.000 | 67.000 | 64.250 | 64.110 | 67.000 | 64.210 | 64.230 | 64.060 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.000 | 64.020 | 72.170 | 64.170 | 67.000 | 71.610 | 67.060 | 64.400 | 67.000 | 65.020 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.410 | 66.540 | 67.730 | 67.390 | 66.860 | 67.840 | 64.930 | 61.220 | 60.000 | 59.110 |
| C140 | C160 | | | | | | | | |
| 62.965 | 62.987 | | | | | | | | |

12/22/87 08:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.940 | 63.980 | 63.900 | 64.240 | 64.480 | 63.900 | 63.820 | 63.710 | 64.130 | 64.390 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.010 | 64.010 | 63.940 | 64.010 | 64.220 | 64.050 | 64.650 | 64.480 | 64.390 | 64.370 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.680 | 63.590 | 67.000 | 67.000 | 64.230 | 64.040 | 67.000 | 64.190 | 64.250 | 64.060 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 64.040 | 72.170 | 64.130 | 67.000 | 71.600 | 67.060 | 64.490 | 67.000 | 65.100 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.400 | 66.540 | 67.660 | 67.390 | 66.750 | 67.770 | 64.960 | 61.220 | 60.000 | 59.120 |
| C140 | C160 | | | | | | | | |
| 62.963 | 62.986 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 08:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.940 | 63.980 | 63.900 | 64.220 | 64.450 | 63.960 | 63.820 | 63.750 | 64.130 | 64.390 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.960 | 64.030 | 63.940 | 63.980 | 64.150 | 64.090 | 64.610 | 64.450 | 64.350 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.660 | 63.660 | 67.000 | 67.000 | 64.210 | 64.020 | 67.000 | 64.300 | 64.230 | 64.110 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.960 | 64.020 | 72.140 | 64.210 | 67.000 | 71.630 | 67.060 | 64.490 | 67.000 | 65.080 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.370 | 66.540 | 67.650 | 67.430 | 66.800 | 67.830 | 65.000 | 61.220 | 60.000 | 59.060 |
| C140 | C160 | | | | | | | | |
| 62.963 | 62.985 | | | | | | | | |

12/22/87 08:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.960 | 63.980 | 63.900 | 64.240 | 64.450 | 63.920 | 63.830 | 63.790 | 64.130 | 64.360 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.960 | 64.020 | 63.980 | 64.170 | 64.050 | 64.580 | 64.490 | 64.360 | 64.300 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.640 | 63.640 | 67.000 | 67.000 | 64.230 | 64.000 | 67.000 | 64.300 | 64.230 | 64.020 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.910 | 64.040 | 72.140 | 64.190 | 67.000 | 71.560 | 67.060 | 64.470 | 67.000 | 65.000 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.420 | 66.540 | 67.670 | 67.460 | 66.790 | 67.850 | 64.970 | 61.220 | 60.000 | 59.120 |
| C140 | C160 | | | | | | | | |
| 62.962 | 62.984 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 09:00

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.920 | 63.960 | 63.900 | 64.200 | 64.430 | 63.880 | 63.790 | 63.710 | 64.150 | 64.410 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.980 | 63.980 | 64.070 | 64.150 | 64.090 | 64.580 | 64.450 | 64.350 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.440 | 63.660 | 67.000 | 67.000 | 64.190 | 64.020 | 67.000 | 64.210 | 64.230 | 64.080 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.910 | 64.000 | 71.970 | 64.170 | 67.000 | 71.640 | 67.060 | 64.470 | 67.000 | 65.010 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.410 | 66.540 | 67.680 | 67.480 | 66.870 | 67.820 | 65.000 | 61.220 | 60.000 | 59.210 |
| C140 | C160 | | | | | | | | |
| 62.961 | 62.983 | | | | | | | | |

12/22/87 09:15

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.940 | 63.980 | 63.900 | 64.180 | 64.430 | 63.920 | 63.820 | 63.790 | 64.030 | 64.350 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.030 | 63.960 | 63.960 | 64.010 | 64.180 | 64.090 | 64.610 | 64.520 | 64.350 | 64.320 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.600 | 63.610 | 67.000 | 67.000 | 64.210 | 64.000 | 67.000 | 64.270 | 64.230 | 63.910 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.960 | 64.060 | 72.080 | 64.170 | 67.000 | 71.670 | 67.060 | 64.430 | 67.000 | 65.040 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.340 | 66.540 | 67.700 | 67.500 | 66.840 | 67.800 | 65.050 | 61.220 | 60.000 | 59.120 |
| C140 | C160 | | | | | | | | |
| 62.961 | 62.982 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 09:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.940 | 64.010 | 63.900 | 64.200 | 64.480 | 63.900 | 63.790 | 63.770 | 64.110 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.900 | 64.050 | 64.010 | 64.180 | 64.090 | 64.620 | 64.430 | 64.370 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.680 | 63.610 | 67.000 | 67.000 | 64.130 | 64.000 | 67.000 | 64.150 | 64.190 | 64.000 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.910 | 64.000 | 72.170 | 64.190 | 67.000 | 71.690 | 67.060 | 64.430 | 67.000 | 64.940 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.340 | 66.540 | 67.660 | 67.440 | 66.860 | 67.880 | 65.050 | 61.220 | 60.000 | 59.120 |
| C140 | C160 | | | | | | | | |
| 62.961 | 62.981 | | | | | | | | |

12/22/87 09:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.920 | 63.980 | 63.900 | 64.200 | 64.430 | 63.840 | 63.750 | 63.770 | 64.150 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.010 | 63.980 | 64.050 | 63.980 | 64.180 | 64.030 | 64.670 | 64.450 | 64.310 | 64.370 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.640 | 63.640 | 67.000 | 67.000 | 64.230 | 64.060 | 67.000 | 64.190 | 64.190 | 64.060 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.870 | 64.020 | 72.170 | 64.130 | 67.000 | 71.670 | 67.060 | 64.550 | 67.000 | 64.900 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.420 | 66.540 | 67.720 | 67.450 | 66.770 | 67.800 | 65.040 | 61.220 | 60.000 | 59.110 |
| C140 | C160 | | | | | | | | |
| 62.960 | 62.980 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 10:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.900 | 63.980 | 63.880 | 64.180 | 64.430 | 63.880 | 63.750 | 63.710 | 64.110 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.960 | 63.960 | 64.010 | 64.150 | 64.070 | 64.540 | 64.430 | 64.260 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.510 | 63.570 | 67.000 | 67.000 | 64.170 | 63.980 | 67.000 | 64.270 | 64.210 | 64.080 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 64.020 | 72.140 | 64.170 | 67.000 | 71.650 | 67.060 | 64.490 | 67.000 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.380 | 66.540 | 67.720 | 67.520 | 66.880 | 67.870 | 65.050 | 61.220 | 60.000 | 59.190 |
| C140 | C160 | | | | | | | | |
| 62.959 | 62.979 | | | | | | | | |

12/22/87 10:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.920 | 63.940 | 63.860 | 64.200 | 64.450 | 63.880 | 63.770 | 63.710 | 64.050 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.960 | 63.920 | 63.960 | 64.030 | 64.180 | 64.030 | 64.520 | 64.430 | 64.310 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.570 | 63.610 | 67.000 | 67.000 | 64.190 | 63.980 | 67.000 | 64.150 | 64.190 | 64.040 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 64.040 | 72.060 | 64.170 | 67.000 | 71.610 | 67.060 | 64.490 | 67.000 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.360 | 66.540 | 67.700 | 67.460 | 66.790 | 67.930 | 65.030 | 61.220 | 60.000 | 59.170 |
| C140 | C160 | | | | | | | | |
| 62.958 | 62.979 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 10:30

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.920 | 63.980 | 63.900 | 64.200 | 64.410 | 63.900 | 63.820 | 63.660 | 64.070 | 64.410 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.010 | 63.980 | 63.960 | 64.030 | 64.180 | 64.090 | 64.580 | 64.450 | 64.320 | 64.390 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.530 | 63.680 | 67.000 | 67.000 | 64.190 | 64.020 | 67.000 | 64.130 | 64.210 | 64.020 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.960 | 63.980 | 72.100 | 64.130 | 67.000 | 71.350 | 67.060 | 64.440 | 67.000 | 65.020 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.480 | 66.540 | 67.720 | 67.470 | 66.860 | 67.920 | 65.040 | 61.220 | 60.000 | 59.120 |
| C140 | C160 | | | | | | | | |
| 62.957 | 62.978 | | | | | | | | |

12/22/87 10:45

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.920 | 63.980 | 63.860 | 64.180 | 64.450 | 63.900 | 63.750 | 63.750 | 64.050 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.940 | 64.010 | 63.900 | 64.180 | 64.050 | 64.560 | 64.410 | 64.310 | 64.350 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.570 | 63.590 | 67.000 | 67.000 | 64.190 | 63.980 | 67.000 | 64.130 | 64.210 | 64.040 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 64.020 | 72.120 | 64.150 | 67.000 | 71.690 | 67.060 | 64.380 | 67.000 | 65.010 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.400 | 66.540 | 67.740 | 67.510 | 66.820 | 67.900 | 65.050 | 61.220 | 60.000 | 59.210 |
| C140 | C160 | | | | | | | | |
| 62.956 | 62.976 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 11:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.860 | 63.960 | 63.880 | 64.150 | 64.370 | 63.860 | 63.710 | 63.730 | 64.030 | 64.500 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.010 | 63.920 | 64.030 | 63.980 | 64.200 | 64.050 | 64.650 | 64.410 | 64.260 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.570 | 63.670 | 67.000 | 67.000 | 64.190 | 64.010 | 67.000 | 64.250 | 64.190 | 64.060 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.890 | 63.990 | 72.160 | 64.120 | 67.000 | 71.610 | 67.060 | 64.290 | 67.000 | 64.940 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.450 | 66.540 | 67.750 | 67.470 | 66.690 | 67.900 | 65.060 | 61.220 | 60.000 | 59.140 |
| C140 | C160 | | | | | | | | |
| 62.955 | 62.975 | | | | | | | | |

12/22/87 11:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.900 | 63.860 | 63.860 | 64.200 | 64.430 | 63.860 | 63.750 | 63.690 | 64.030 | 64.450 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.030 | 63.940 | 63.980 | 63.940 | 64.220 | 64.030 | 64.560 | 64.450 | 64.280 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.680 | 63.590 | 67.000 | 67.000 | 64.190 | 64.000 | 67.000 | 64.060 | 64.170 | 64.080 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.980 | 64.000 | 72.140 | 64.110 | 67.000 | 71.600 | 67.060 | 64.320 | 67.000 | 64.930 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.510 | 66.540 | 67.720 | 67.480 | 66.690 | 67.900 | 65.030 | 61.220 | 60.000 | 59.180 |
| C140 | C160 | | | | | | | | |
| 62.953 | 62.974 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 11:30

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.920 | 63.940 | 63.840 | 64.200 | 64.450 | 63.820 | 63.730 | 63.690 | 64.030 | 64.350 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.010 | 63.940 | 63.980 | 64.010 | 64.180 | 63.980 | 64.560 | 64.410 | 64.350 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.550 | 63.650 | 67.000 | 67.000 | 64.190 | 63.990 | 67.000 | 64.080 | 64.190 | 64.030 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.950 | 64.010 | 72.120 | 64.100 | 67.000 | 71.520 | 67.060 | 64.290 | 67.000 | 65.000 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.480 | 66.540 | 67.760 | 67.480 | 66.830 | 67.850 | 65.030 | 61.220 | 60.000 | 59.190 |
| C140 | C160 | | | | | | | | |
| 62.952 | 62.973 | | | | | | | | |

12/22/87 11:45

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.860 | 63.970 | 63.880 | 64.180 | 64.350 | 63.840 | 63.730 | 63.730 | 64.110 | 64.290 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.970 | 63.990 | 63.880 | 63.920 | 64.160 | 63.940 | 64.540 | 64.390 | 64.440 | 64.330 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.510 | 63.700 | 67.000 | 67.000 | 64.150 | 63.980 | 67.000 | 64.230 | 64.170 | 63.960 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 64.020 | 72.080 | 64.080 | 67.000 | 71.610 | 67.060 | 64.250 | 67.000 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.440 | 66.540 | 67.760 | 67.410 | 66.900 | 67.880 | 65.020 | 61.220 | 60.000 | 59.260 |
| C140 | C160 | | | | | | | | |
| 62.951 | 62.972 | | | | | | | | |

**ATTACHMENT 3.3A (Cont.)**

**INDIAN POINT 2 1987**
**FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87**

**ILRT MEASURED INPUT DATA**

12/22/87 12:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.860 | 63.920 | 63.840 | 64.180 | 64.330 | 63.820 | 63.750 | 63.730 | 64.070 | 64.350 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.990 | 63.920 | 63.860 | 63.920 | 64.200 | 63.940 | 64.500 | 64.370 | 64.440 | 64.350 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.570 | 63.680 | 67.000 | 67.000 | 64.170 | 64.040 | 67.000 | 64.080 | 64.150 | 64.000 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.000 | 63.980 | 72.100 | 64.080 | 67.000 | 71.520 | 67.060 | 64.270 | 67.000 | 65.000 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.410 | 66.540 | 67.740 | 67.470 | 66.830 | 67.910 | 65.030 | 61.220 | 60.000 | 59.280 |
| C140 | C160 | | | | | | | | |
| 62.950 | 62.971 | | | | | | | | |

12/22/87 12:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.880 | 63.960 | 63.860 | 64.200 | 64.430 | 63.860 | 63.790 | 63.730 | 64.050 | 64.310 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.050 | 64.010 | 64.050 | 63.980 | 64.180 | 63.960 | 64.560 | 64.390 | 64.410 | 64.350 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.530 | 63.530 | 67.000 | 67.000 | 64.130 | 64.000 | 67.000 | 64.080 | 64.150 | 64.040 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 63.940 | 72.060 | 64.040 | 67.000 | 71.620 | 67.060 | 64.250 | 67.000 | 65.010 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.440 | 66.540 | 67.730 | 67.460 | 66.860 | 67.760 | 65.030 | 61.220 | 60.000 | 59.210 |
| C140 | C160 | | | | | | | | |
| 62.950 | 62.970 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 12:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.860 | 63.940 | 63.860 | 64.180 | 64.390 | 63.820 | 63.750 | 63.730 | 64.030 | 64.280 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.920 | 64.030 | 63.960 | 64.180 | 63.960 | 64.580 | 64.500 | 64.370 | 64.350 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.490 | 63.510 | 67.000 | 67.000 | 64.130 | 64.000 | 67.000 | 64.000 | 64.110 | 64.000 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.960 | 64.000 | 72.080 | 64.040 | 67.000 | 71.500 | 67.060 | 64.250 | 67.000 | 65.020 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.400 | 66.540 | 67.740 | 67.500 | 66.850 | 67.880 | 65.040 | 61.220 | 60.000 | 59.230 |
| C140 | C160 | | | | | | | | |
| 62.948 | 62.970 | | | | | | | | |

12/22/87 12:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.860 | 63.840 | 63.820 | 64.150 | 64.390 | 63.880 | 63.790 | 63.770 | 64.090 | 64.350 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.010 | 63.960 | 64.070 | 63.960 | 64.150 | 64.070 | 64.560 | 64.670 | 64.430 | 64.350 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.550 | 63.490 | 67.000 | 67.000 | 64.110 | 64.000 | 67.000 | 64.020 | 64.130 | 64.110 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.020 | 63.850 | 72.060 | 64.020 | 67.000 | 71.610 | 67.060 | 64.230 | 67.000 | 65.040 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.530 | 66.540 | 67.660 | 67.530 | 66.790 | 67.880 | 65.040 | 61.220 | 60.000 | 59.230 |
| C140 | C160 | | | | | | | | |
| 62.947 | 62.969 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 13:00

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.880 | 63.920 | 63.840 | 64.150 | 64.370 | 63.820 | 63.730 | 63.690 | 64.050 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.960 | 63.940 | 63.900 | 63.960 | 64.180 | 63.940 | 64.560 | 64.390 | 64.280 | 64.350 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.560 | 63.560 | 67.000 | 67.000 | 64.130 | 63.960 | 67.000 | 64.090 | 64.150 | 63.940 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.870 | 63.980 | 72.060 | 64.070 | 67.000 | 71.520 | 67.060 | 64.260 | 67.000 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.410 | 66.540 | 67.780 | 67.500 | 66.770 | 67.850 | 65.060 | 61.220 | 60.000 | 59.200 |
| C140 | C160 | | | | | | | | |
| 62.946 | 62.968 | | | | | | | | |

12/22/87 13:15

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.860 | 63.840 | 63.820 | 64.130 | 64.370 | 63.820 | 63.770 | 63.770 | 64.070 | 64.280 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.920 | 63.960 | 63.900 | 64.130 | 63.900 | 64.500 | 64.500 | 64.410 | 64.350 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.660 | 63.550 | 67.000 | 67.000 | 64.130 | 64.020 | 67.000 | 64.020 | 64.110 | 64.000 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.910 | 63.940 | 72.040 | 64.020 | 67.000 | 71.550 | 67.060 | 64.250 | 67.000 | 65.020 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.510 | 66.540 | 67.690 | 67.510 | 66.880 | 67.920 | 65.090 | 61.220 | 60.000 | 59.260 |
| C140 | C160 | | | | | | | | |
| 62.946 | 62.966 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 13:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.860 | 63.920 | 63.840 | 64.130 | 64.410 | 63.860 | 63.770 | 63.690 | 64.010 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.920 | 64.050 | 63.960 | 64.150 | 64.010 | 64.560 | 64.620 | 64.320 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.430 | 63.530 | 67.000 | 67.000 | 64.110 | 63.910 | 67.000 | 64.020 | 64.130 | 64.000 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.890 | 63.940 | 71.950 | 64.060 | 67.000 | 71.380 | 67.060 | 64.270 | 67.000 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.530 | 66.540 | 67.700 | 67.540 | 66.690 | 67.800 | 65.100 | 61.220 | 60.000 | 59.220 |
| C140 | C160 | | | | | | | | |
| 62.945 | 62.966 | | | | | | | | |

12/22/87 13:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.840 | 63.940 | 63.860 | 64.110 | 64.370 | 63.880 | 63.820 | 63.710 | 64.100 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.900 | 63.940 | 63.900 | 64.010 | 64.140 | 64.010 | 64.610 | 64.460 | 64.220 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.550 | 63.530 | 67.000 | 67.000 | 64.150 | 63.940 | 67.000 | 64.040 | 64.110 | 63.980 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.850 | 63.910 | 72.120 | 64.110 | 67.000 | 71.520 | 67.060 | 64.250 | 67.000 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.460 | 66.540 | 67.710 | 67.560 | 66.760 | 67.890 | 65.110 | 61.220 | 60.000 | 59.160 |
| C140 | C160 | | | | | | | | |
| 62.945 | 62.966 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 14:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.840 | 63.900 | 63.790 | 64.110 | 64.350 | 63.820 | 63.710 | 63.660 | 64.090 | 64.260 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.920 | 63.900 | 63.900 | 64.010 | 64.130 | 63.900 | 64.580 | 64.310 | 64.220 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.530 | 63.570 | 67.000 | 67.000 | 64.130 | 63.980 | 67.000 | 64.130 | 64.110 | 64.060 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.890 | 63.910 | 72.120 | 64.080 | 67.000 | 71.550 | 67.060 | 64.230 | 67.000 | 64.940 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.430 | 66.540 | 67.770 | 67.530 | 66.890 | 68.000 | 65.090 | 61.220 | 60.000 | 59.320 |
| C140 | C160 | | | | | | | | |
| 62.943 | 62.965 | | | | | | | | |

12/22/87 14:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.840 | 63.820 | 63.820 | 64.130 | 64.320 | 63.820 | 63.770 | 63.790 | 64.030 | 64.280 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.030 | 63.880 | 63.920 | 63.900 | 64.050 | 63.820 | 64.480 | 64.370 | 64.350 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.620 | 63.550 | 67.000 | 67.000 | 64.130 | 64.020 | 67.000 | 63.980 | 64.110 | 63.980 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.980 | 63.940 | 72.100 | 64.000 | 67.000 | 71.520 | 67.060 | 64.250 | 67.000 | 65.020 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.540 | 66.540 | 67.750 | 67.450 | 66.920 | 67.920 | 65.110 | 61.220 | 60.000 | 59.250 |
| C140 | C160 | | | | | | | | |
| 62.942 | 62.964 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 14:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.770 | 63.900 | 63.800 | 64.140 | 64.340 | 63.820 | 63.730 | 63.730 | 63.990 | 64.390 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 64.010 | 63.900 | 63.990 | 63.970 | 64.160 | 63.940 | 64.520 | 64.370 | 64.410 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.430 | 63.470 | 67.000 | 67.000 | 64.110 | 63.980 | 67.000 | 64.060 | 64.060 | 64.040 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.000 | 63.960 | 72.000 | 64.000 | 67.000 | 71.550 | 67.060 | 64.250 | 67.000 | 65.020 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.470 | 66.540 | 67.750 | 67.500 | 66.760 | 67.930 | 65.090 | 61.220 | 60.000 | 59.220 |
| C140 | C160 | | | | | | | | |
| 62.942 | 62.964 | | | | | | | | |

12/22/87 14:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.820 | 63.900 | 63.790 | 64.130 | 64.350 | 63.790 | 63.730 | 63.710 | 64.030 | 64.350 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.920 | 63.940 | 63.900 | 64.150 | 63.920 | 64.560 | 64.350 | 64.370 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.570 | 63.590 | 67.000 | 67.000 | 64.130 | 64.000 | 67.000 | 64.000 | 64.110 | 63.960 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.870 | 63.980 | 72.020 | 64.000 | 67.000 | 71.250 | 67.060 | 64.230 | 67.000 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.470 | 66.540 | 67.770 | 67.500 | 66.780 | 67.890 | 65.090 | 61.220 | 60.000 | 59.270 |
| C140 | C160 | | | | | | | | |
| 62.941 | 62.963 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 15:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.790 | 63.880 | 63.840 | 64.150 | 64.370 | 63.770 | 63.710 | 63.730 | 63.940 | 64.410 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.880 | 64.050 | 63.920 | 64.150 | 63.900 | 64.500 | 64.350 | 64.320 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.390 | 63.570 | 67.000 | 67.000 | 64.130 | 64.020 | 67.000 | 64.000 | 64.090 | 63.980 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.920 | 63.900 | 72.020 | 64.000 | 67.000 | 71.560 | 67.060 | 64.260 | 67.000 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.450 | 66.540 | 67.830 | 67.510 | 66.790 | 67.930 | 65.070 | 61.220 | 60.000 | 59.300 |
| C140 | C160 | | | | | | | | |
| 62.941 | 62.963 | | | | | | | | |

12/22/87 15:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.840 | 63.920 | 63.840 | 64.110 | 64.350 | 63.840 | 63.730 | 63.710 | 64.050 | 64.410 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.920 | 63.920 | 63.860 | 64.140 | 63.940 | 64.540 | 64.390 | 64.200 | 64.290 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.470 | 63.590 | 67.000 | 67.000 | 64.130 | 63.960 | 67.000 | 64.110 | 64.130 | 64.060 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.850 | 63.890 | 72.100 | 64.040 | 67.000 | 71.290 | 67.060 | 64.270 | 67.000 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.400 | 66.540 | 67.730 | 67.540 | 66.760 | 67.940 | 65.120 | 61.220 | 60.000 | 59.210 |
| C140 | C160 | | | | | | | | |
| 62.941 | 62.963 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 15:30

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.820 | 63.840 | 63.790 | 64.110 | 64.320 | 63.790 | 63.730 | 63.690 | 63.980 | 64.240 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.920 | 63.880 | 63.960 | 63.880 | 64.090 | 63.880 | 64.430 | 64.320 | 64.280 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.600 | 63.590 | 67.000 | 67.000 | 64.130 | 63.980 | 67.000 | 64.000 | 64.080 | 63.910 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.890 | 63.960 | 72.080 | 64.020 | 67.000 | 71.540 | 67.060 | 64.230 | 67.000 | 64.890 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.480 | 66.540 | 67.790 | 67.510 | 66.880 | 67.910 | 65.120 | 61.220 | 60.000 | 59.330 |
| C140 | C160 | | | | | | | | |
| 62.939 | 62.960 | | | | | | | | |

12/22/87 15:45

| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
|---|---|---|---|---|---|---|---|---|---|
| 63.770 | 63.900 | 63.820 | 64.130 | 64.370 | 63.820 | 63.710 | 63.690 | 64.030 | 64.450 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.880 | 64.030 | 63.960 | 64.150 | 63.940 | 64.540 | 64.370 | 64.320 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.490 | 63.530 | 67.000 | 67.000 | 64.110 | 64.000 | 67.000 | 63.980 | 64.060 | 64.000 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 63.980 | 72.080 | 64.000 | 67.000 | 71.310 | 67.060 | 64.250 | 67.000 | 65.000 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.470 | 66.540 | 67.790 | 67.520 | 66.680 | 67.930 | 65.100 | 61.220 | 60.000 | 59.270 |
| C140 | C160 | | | | | | | | |
| 62.939 | 62.960 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 16:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.860 | 63.820 | 63.820 | 64.140 | 64.370 | 63.730 | 63.710 | 63.730 | 64.050 | 64.240 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.990 | 63.880 | 63.920 | 63.900 | 64.100 | 63.860 | 64.560 | 64.370 | 64.370 | 64.270 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.510 | 63.570 | 67.000 | 67.000 | 64.150 | 64.000 | 67.000 | 63.980 | 64.130 | 64.020 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.910 | 63.910 | 72.060 | 64.000 | 67.000 | 71.520 | 67.060 | 64.210 | 67.000 | 64.990 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.590 | 66.540 | 67.810 | 67.490 | 66.900 | 67.940 | 65.110 | 61.220 | 60.000 | 59.270 |
| C140 | C160 | | | | | | | | |
| 62.939 | 62.960 | | | | | | | | |

12/22/87 16:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.770 | 63.860 | 63.820 | 64.130 | 64.310 | 63.820 | 63.750 | 63.750 | 64.050 | 64.280 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.980 | 63.860 | 63.960 | 63.900 | 64.070 | 63.840 | 64.520 | 64.390 | 64.350 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.490 | 63.550 | 67.000 | 67.000 | 64.110 | 64.000 | 67.000 | 63.960 | 64.020 | 63.870 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 63.980 | 72.060 | 63.980 | 67.000 | 71.270 | 67.060 | 64.210 | 67.000 | 65.000 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.550 | 66.540 | 67.800 | 67.560 | 66.850 | 67.910 | 65.100 | 61.220 | 60.000 | 59.310 |
| C140 | C160 | | | | | | | | |
| 62.938 | 62.960 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 16:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.730 | 63.860 | 63.820 | 64.130 | 64.320 | 63.820 | 63.730 | 63.730 | 64.030 | 64.320 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.960 | 63.860 | 64.070 | 63.940 | 64.130 | 63.900 | 64.540 | 64.390 | 64.350 | 64.320 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.510 | 63.510 | 67.000 | 67.000 | 64.020 | 63.980 | 67.000 | 63.960 | 64.080 | 63.960 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 63.910 | 72.060 | 63.980 | 67.000 | 71.560 | 67.060 | 64.250 | 67.000 | 65.030 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.470 | 66.540 | 67.780 | 67.550 | 66.840 | 67.920 | 65.110 | 61.220 | 60.000 | 59.270 |
| C140 | C160 | | | | | | | | |
| 62.936 | 62.959 | | | | | | | | |

12/22/87 16:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.730 | 63.750 | 63.750 | 64.140 | 64.330 | 63.770 | 63.670 | 63.710 | 64.030 | 64.240 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.990 | 63.880 | 63.940 | 63.920 | 64.050 | 63.800 | 64.480 | 64.370 | 64.350 | 64.290 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.470 | 63.590 | 67.000 | 67.000 | 64.110 | 63.980 | 67.000 | 64.000 | 64.060 | 63.960 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.910 | 63.940 | 72.060 | 63.980 | 67.000 | 71.330 | 67.060 | 64.230 | 67.000 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.660 | 66.540 | 67.830 | 67.540 | 66.910 | 67.850 | 65.110 | 61.220 | 60.000 | 59.270 |
| C140 | C160 | | | | | | | | |
| 62.936 | 62.958 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 17:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.820 | 63.880 | 63.790 | 64.130 | 64.390 | 63.840 | 63.750 | 63.730 | 63.980 | 64.240 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.840 | 64.010 | 63.920 | 64.130 | 63.880 | 64.430 | 64.410 | 64.350 | 64.260 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.430 | 63.440 | 67.000 | 67.000 | 64.110 | 63.940 | 67.000 | 64.020 | 64.040 | 63.940 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.870 | 63.910 | 72.000 | 63.980 | 67.000 | 71.550 | 67.060 | 64.190 | 67.000 | 65.000 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.550 | 66.540 | 67.730 | 67.570 | 66.900 | 67.900 | 65.110 | 61.220 | 60.000 | 59.310 |
| C140 | C160 | | | | | | | | |
| 62.936 | 62.957 | | | | | | | | |

12/22/87 17:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.820 | 63.750 | 63.790 | 64.110 | 64.350 | 63.770 | 63.690 | 63.690 | 64.030 | 64.260 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.900 | 63.980 | 63.960 | 64.130 | 63.920 | 64.430 | 64.320 | 64.320 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.380 | 63.510 | 67.000 | 67.000 | 64.080 | 63.870 | 67.000 | 64.040 | 64.080 | 63.980 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.890 | 63.890 | 71.950 | 64.000 | 67.000 | 71.290 | 67.060 | 64.170 | 67.000 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.600 | 66.540 | 67.850 | 67.600 | 66.870 | 67.910 | 65.130 | 61.220 | 60.000 | 59.290 |
| C140 | C160 | | | | | | | | |
| 62.935 | 62.956 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 17:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.800 | 63.800 | 63.750 | 64.070 | 64.270 | 63.750 | 63.710 | 63.690 | 63.970 | 64.330 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.920 | 63.860 | 63.900 | 63.860 | 64.050 | 63.920 | 64.460 | 64.290 | 64.240 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.430 | 63.570 | 67.000 | 67.000 | 64.080 | 63.910 | 67.000 | 64.040 | 64.060 | 63.980 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.890 | 63.890 | 71.970 | 64.000 | 67.000 | 71.480 | 67.060 | 64.210 | 67.000 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.610 | 66.540 | 67.840 | 67.560 | 66.830 | 67.960 | 65.160 | 61.220 | 60.000 | 59.370 |
| C140 | C160 | | | | | | | | |
| 62.934 | 62.955 | | | | | | | | |

12/22/87 17:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.820 | 63.860 | 63.770 | 64.110 | 64.270 | 63.770 | 63.690 | 63.650 | 63.920 | 64.270 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.880 | 63.880 | 63.860 | 63.880 | 64.110 | 63.840 | 64.460 | 64.330 | 64.220 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.400 | 63.640 | 67.000 | 67.000 | 64.060 | 63.910 | 67.000 | 64.000 | 64.060 | 63.940 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.810 | 63.890 | 71.950 | 64.000 | 67.000 | 71.500 | 67.060 | 64.190 | 67.000 | 64.890 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.480 | 66.540 | 67.910 | 67.580 | 66.900 | 67.910 | 65.120 | 61.220 | 60.000 | 59.370 |
| C140 | C160 | | | | | | | | |
| 62.933 | 62.954 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 18:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.770 | 63.710 | 63.820 | 64.110 | 64.310 | 63.790 | 63.710 | 63.710 | 63.960 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.820 | 63.940 | 63.880 | 64.090 | 63.790 | 64.430 | 64.390 | 64.350 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.400 | 63.470 | 67.000 | 67.000 | 64.060 | 63.980 | 67.000 | 64.020 | 64.060 | 63.960 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.980 | 63.870 | 71.930 | 63.960 | 67.000 | 71.330 | 67.060 | 64.210 | 67.000 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.590 | 66.540 | 67.780 | 67.540 | 66.840 | 67.920 | 65.150 | 61.220 | 60.000 | 59.280 |
| C140 | C160 | | | | | | | | |
| 62.932 | 62.954 | | | | | | | | |

12/22/87 18:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.730 | 63.820 | 63.770 | 64.090 | 64.320 | 63.750 | 63.690 | 63.730 | 64.110 | 64.310 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.860 | 63.940 | 63.880 | 64.070 | 63.840 | 64.500 | 64.430 | 64.370 | 64.260 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.340 | 63.530 | 67.000 | 67.000 | 64.060 | 63.960 | 67.000 | 63.940 | 64.040 | 64.000 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.910 | 63.940 | 71.870 | 63.940 | 67.000 | 71.340 | 67.060 | 64.210 | 67.000 | 64.990 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.560 | 66.540 | 67.810 | 67.550 | 66.910 | 67.980 | 65.170 | 61.220 | 60.000 | 59.370 |
| C140 | C160 | | | | | | | | |
| 62.933 | 62.954 | | | | | | | | |

ATTACHMENT 3.3A (Cont.)

INDIAN POINT 2 1987
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT MEASURED INPUT DATA

12/22/87 18:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.730 | 63.820 | 63.750 | 64.110 | 64.240 | 63.690 | 63.650 | 63.690 | 63.920 | 64.200 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.880 | 64.010 | 63.860 | 64.070 | 63.860 | 64.440 | 64.330 | 64.310 | 64.290 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.360 | 63.610 | 67.000 | 67.000 | 64.060 | 63.960 | 67.000 | 63.960 | 64.040 | 63.960 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.850 | 63.890 | 71.850 | 63.960 | 67.000 | 71.550 | 67.060 | 64.210 | 67.150 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.530 | 66.540 | 67.900 | 67.530 | 66.910 | 67.880 | 65.140 | 61.220 | 60.000 | 59.350 |
| C140 | C160 | | | | | | | | |
| 62.932 | 62.954 | | | | | | | | |

ATTACHMENT 3.3B

INDIAN POINT 2 1987

FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT REDUCED INPUT VARIABLES

| Time (hh:mm) | Press. (PSIA) | V.P. (PSI) | Temp. (R) | Dewpoint (V) | Mass (LbM) |
|---|---|---|---|---|---|
| 18:30 | 63.028 | 0.2047 | 524.595 | 0.205 | 843649.88 |
| 18:45 | 63.026 | 0.2047 | 524.605 | 0.205 | 843619.03 |
| 19:00 | 63.025 | 0.2046 | 524.586 | 0.205 | 843623.74 |
| 19:15 | 63.023 | 0.2047 | 524.572 | 0.205 | 843632.67 |
| 19:30 | 63.022 | 0.2046 | 524.576 | 0.205 | 843605.67 |
| 19:45 | 63.021 | 0.2046 | 524.572 | 0.205 | 843599.99 |
| 20:00 | 63.020 | 0.2044 | 524.571 | 0.204 | 843596.79 |
| 20:15 | 63.019 | 0.2044 | 524.547 | 0.204 | 843608.86 |
| 20:30 | 63.017 | 0.2043 | 524.532 | 0.204 | 843613.54 |
| 20:45 | 63.016 | 0.2043 | 524.525 | 0.204 | 843605.80 |
| 21:00 | 63.015 | 0.2044 | 524.524 | 0.204 | 843599.93 |
| 21:15 | 63.014 | 0.2044 | 524.521 | 0.204 | 843583.60 |
| 21:30 | 63.013 | 0.2042 | 524.503 | 0.204 | 843601.36 |
| 21:45 | 63.011 | 0.2042 | 524.485 | 0.204 | 843618.85 |
| 22:00 | 63.010 | 0.2041 | 524.493 | 0.204 | 843587.23 |
| 22:15 | 63.008 | 0.2039 | 524.468 | 0.204 | 843608.84 |
| 22:30 | 63.008 | 0.2039 | 524.463 | 0.204 | 843609.68 |
| 22:45 | 63.007 | 0.2039 | 524.435 | 0.204 | 843635.57 |
| 23:00 | 63.006 | 0.2038 | 524.457 | 0.204 | 843593.34 |
| 23:15 | 63.004 | 0.2039 | 524.452 | 0.204 | 843572.92 |
| 23:30 | 63.003 | 0.2039 | 524.449 | 0.204 | 843564.56 |
| 23:45 | 63.002 | 0.2040 | 524.452 | 0.204 | 843546.32 |
| 00:00 | 63.001 | 0.2041 | 524.438 | 0.204 | 843552.68 |
| 00:15 | 63.000 | 0.2040 | 524.451 | 0.204 | 843520.55 |
| 00:30 | 62.999 | 0.2038 | 524.418 | 0.204 | 843569.04 |
| 00:45 | 62.998 | 0.2039 | 524.419 | 0.204 | 843553.41 |
| 01:00 | 62.998 | 0.2037 | 524.422 | 0.204 | 843537.55 |
| 01:15 | 62.998 | 0.2038 | 524.417 | 0.204 | 843545.34 |
| 01:30 | 62.996 | 0.2039 | 524.417 | 0.204 | 843529.62 |
| 01:45 | 62.995 | 0.2038 | 524.402 | 0.204 | 843541.57 |
| 02:00 | 62.995 | 0.2039 | 524.397 | 0.204 | 843534.21 |
| 02:15 | 62.995 | 0.2037 | 524.393 | 0.204 | 843543.45 |
| 02:30 | 62.993 | 0.2038 | 524.379 | 0.204 | 843552.92 |
| 02:45 | 62.993 | 0.2036 | 524.386 | 0.204 | 843536.12 |
| 03:00 | 62.992 | 0.2038 | 524.386 | 0.204 | 843514.08 |
| 03:15 | 62.990 | 0.2035 | 524.354 | 0.204 | 843548.44 |
| 03:30 | 62.989 | 0.2035 | 524.373 | 0.204 | 843504.63 |
| 03:45 | 62.989 | 0.2036 | 524.374 | 0.204 | 843495.64 |

ATTACHMENT 3.3B (Cont.)

INDIAN POINT 2 1987

FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT REDUCED INPUT VARIABLES

| Time (hh:mm) | Press. (PSIA) | V.P. (PSI) | Temp. (R) | Dewpoint (V) | Mass (LbM) |
|---|---|---|---|---|---|
| 04:00 | 62.988 | 0.2036 | 524.351 | 0.204 | 843525.37 |
| 04:15 | 62.987 | 0.2034 | 524.350 | 0.203 | 843522.05 |
| 04:30 | 62.986 | 0.2036 | 524.356 | 0.204 | 843496.89 |
| 04:45 | 62.986 | 0.2035 | 524.355 | 0.203 | 843488.06 |
| 05:00 | 62.984 | 0.2035 | 524.333 | 0.204 | 843507.86 |
| 05:15 | 62.983 | 0.2038 | 524.345 | 0.204 | 843472.37 |
| 05:30 | 62.983 | 0.2033 | 524.336 | 0.203 | 843492.77 |
| 05:45 | 62.983 | 0.2034 | 524.330 | 0.203 | 843487.93 |
| 06:00 | 62.982 | 0.2033 | 524.318 | 0.203 | 843501.34 |
| 06:15 | 62.981 | 0.2033 | 524.310 | 0.203 | 843502.62 |
| 06:30 | 62.980 | 0.2033 | 524.317 | 0.203 | 843484.22 |
| 06:45 | 62.980 | 0.2033 | 524.314 | 0.203 | 843481.11 |
| 07:00 | 62.978 | 0.2033 | 524.316 | 0.203 | 843457.19 |
| 07:15 | 62.978 | 0.2035 | 524.310 | 0.204 | 843465.68 |
| 07:30 | 62.978 | 0.2031 | 524.298 | 0.203 | 843482.46 |
| 07:45 | 62.977 | 0.2032 | 524.298 | 0.203 | 843467.70 |
| 08:00 | 62.976 | 0.2030 | 524.278 | 0.203 | 843488.56 |
| 08:15 | 62.974 | 0.2032 | 524.288 | 0.203 | 843450.10 |
| 08:30 | 62.974 | 0.2032 | 524.288 | 0.203 | 843443.91 |
| 08:45 | 62.973 | 0.2031 | 524.279 | 0.203 | 843445.76 |
| 09:00 | 62.972 | 0.2034 | 524.264 | 0.203 | 843453.03 |
| 09:15 | 62.971 | 0.2033 | 524.273 | 0.203 | 843432.85 |
| 09:30 | 62.971 | 0.2033 | 524.270 | 0.203 | 843431.13 |
| 09:45 | 62.970 | 0.2034 | 524.275 | 0.203 | 843408.29 |
| 10:00 | 62.969 | 0.2034 | 524.254 | 0.203 | 843429.85 |
| 10:15 | 62.968 | 0.2032 | 524.249 | 0.203 | 843432.31 |
| 10:30 | 62.968 | 0.2031 | 524.257 | 0.203 | 843408.78 |
| 10:45 | 62.966 | 0.2034 | 524.253 | 0.203 | 843391.12 |
| 11:00 | 62.965 | 0.2032 | 524.249 | 0.203 | 843385.70 |
| 11:15 | 62.963 | 0.2032 | 524.244 | 0.203 | 843373.77 |
| 11:30 | 62.962 | 0.2030 | 524.237 | 0.203 | 843375.21 |
| 11:45 | 62.962 | 0.2030 | 524.229 | 0.203 | 843374.22 |
| 12:00 | 62.960 | 0.2030 | 524.225 | 0.203 | 843367.01 |
| 12:15 | 62.960 | 0.2030 | 524.236 | 0.203 | 843341.19 |
| 12:30 | 62.959 | 0.2028 | 524.219 | 0.203 | 843358.51 |
| 12:45 | 62.958 | 0.2030 | 524.239 | 0.203 | 843311.09 |
| 13:00 | 62.957 | 0.2028 | 524.208 | 0.203 | 843349.11 |
| 13:15 | 62.956 | 0.2029 | 524.211 | 0.203 | 843329.32 |
| 13:30 | 62.956 | 0.2027 | 524.206 | 0.203 | 843334.89 |

ATTACHMENT 3.3B (Cont.)

INDIAN POINT 2 1987

FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT REDUCED INPUT VARIABLES

| Time (hh:mm) | Press. (PSIA) | V.P. (PSI) | Temp. (R) | Dewpoint (V) | Mass (LbM) |
|---|---|---|---|---|---|
| 13:45 | 62.956 | 0.2028 | 524.211 | 0.203 | 843325.01 |
| 14:00 | 62.954 | 0.2029 | 524.194 | 0.203 | 843331.52 |
| 14:15 | 62.953 | 0.2030 | 524.193 | 0.203 | 843317.38 |
| 14:30 | 62.953 | 0.2030 | 524.200 | 0.203 | 843305.48 |
| 14:45 | 62.952 | 0.2025 | 524.186 | 0.202 | 843322.22 |
| 15:00 | 62.952 | 0.2031 | 524.190 | 0.203 | 843307.76 |
| 15:15 | 62.952 | 0.2027 | 524.191 | 0.203 | 843311.31 |
| 15:30 | 62.950 | 0.2028 | 524.172 | 0.203 | 843307.48 |
| 15:45 | 62.950 | 0.2028 | 524.194 | 0.203 | 843272.14 |
| 16:00 | 62.950 | 0.2028 | 524.186 | 0.203 | 843284.29 |
| 16:15 | 62.949 | 0.2026 | 524.173 | 0.203 | 843302.20 |
| 16:30 | 62.948 | 0.2030 | 524.189 | 0.203 | 843251.41 |
| 16:45 | 62.947 | 0.2025 | 524.161 | 0.203 | 843294.91 |
| 17:00 | 62.947 | 0.2028 | 524.172 | 0.203 | 843266.39 |
| 17:15 | 62.946 | 0.2023 | 524.155 | 0.202 | 843287.38 |
| 17:30 | 62.944 | 0.2028 | 524.148 | 0.203 | 843278.84 |
| 17:45 | 62.944 | 0.2027 | 524.140 | 0.203 | 843279.02 |
| 18:00 | 62.943 | 0.2026 | 524.147 | 0.203 | 843262.92 |
| 18:15 | 62.944 | 0.2027 | 524.152 | 0.203 | 843259.31 |
| 18:30 | 62.943 | 0.2027 | 524.138 | 0.203 | 843275.39 |

ATTACHMENT 3.3C

INDIAN POINT 2 1987

FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT ABSOLUTE TEST METHOD, MASS POINT ANALYSIS RESULTS

| Time (hh:mm) | Mass (LbM) | Leakage (PCT./DAY) | Confidence (PCT./DAY) | UCL (PCT./DAY) |
|---|---|---|---|---|
| 18:30 | 843649.88 | 0.000000 | 0.000000 | 0.000000 |
| 18:45 | 843619.03 | 0.000000 | 0.000000 | 0.000000 |
| 19:00 | 843623.74 | 0.148697 | 0.999641 | 1.148338 |
| 19:15 | 843632.67 | 0.053370 | 0.223288 | 0.276658 |
| 19:30 | 843605.67 | 0.085082 | 0.111810 | 0.196892 |
| 19:45 | 843599.99 | 0.091222 | 0.066702 | 0.157924 |
| 20:00 | 843596.79 | 0.087544 | 0.044786 | 0.132330 |
| 20:15 | 843608.86 | 0.067266 | 0.039419 | 0.106685 |
| 20:30 | 843613.54 | 0.049773 | 0.035390 | 0.085163 |
| 20:45 | 843605.80 | 0.042957 | 0.028660 | 0.071616 |
| 21:00 | 843599.93 | 0.040321 | 0.023236 | 0.063557 |
| 21:15 | 843583.60 | 0.044396 | 0.019586 | 0.063981 |
| 21:30 | 843601.36 | 0.038734 | 0.017420 | 0.056154 |
| 21:45 | 843618.85 | 0.028380 | 0.018240 | 0.046620 |
| 22:00 | 843587.23 | 0.029937 | 0.015776 | 0.045713 |
| 22:15 | 843608.84 | 0.024893 | 0.014648 | 0.039541 |
| 22:30 | 843609.68 | 0.020757 | 0.013522 | 0.034279 |
| 22:45 | 843635.57 | 0.012323 | 0.014679 | 0.027001 |
| 23:00 | 843593.34 | 0.013677 | 0.013152 | 0.026829 |
| 23:15 | 843572.92 | 0.017789 | 0.012493 | 0.030282 |
| 23:30 | 843564.56 | 0.021837 | 0.011971 | 0.033809 |
| 23:45 | 843546.32 | 0.027080 | 0.012043 | 0.039123 |
| 00:00 | 843552.68 | 0.029987 | 0.011342 | 0.041329 |
| 00:15 | 843520.55 | 0.035582 | 0.011764 | 0.047346 |
| 00:30 | 843569.04 | 0.034516 | 0.010852 | 0.045367 |
| 00:45 | 843553.41 | 0.034902 | 0.010006 | 0.044908 |
| 01:00 | 843537.55 | 0.036365 | 0.009360 | 0.045725 |
| 01:15 | 843545.34 | 0.036612 | 0.008681 | 0.045293 |
| 01:30 | 843529.62 | 0.037792 | 0.008154 | 0.045946 |
| 01:45 | 843541.57 | 0.037630 | 0.007602 | 0.045232 |
| 02:00 | 843534.21 | 0.037777 | 0.007104 | 0.044880 |
| 02:15 | 843543.45 | 0.037085 | 0.006686 | 0.043772 |
| 02:30 | 843552.92 | 0.035738 | 0.006412 | 0.042149 |
| 02:45 | 843536.12 | 0.035398 | 0.006037 | 0.041436 |
| 03:00 | 843514.08 | 0.036139 | 0.005733 | 0.041872 |
| 03:15 | 843548.44 | 0.034840 | 0.005556 | 0.040396 |
| 03:30 | 843504.63 | 0.035718 | 0.005321 | 0.041040 |
| 03:45 | 843495.64 | 0.036735 | 0.005134 | 0.041869 |
| 04:00 | 843525.37 | 0.036161 | 0.004899 | 0.041059 |
| 04:15 | 843522.05 | 0.035674 | 0.004675 | 0.040349 |

ATTACHMENT 3.3C (Cont.)

INDIAN POINT 2 1987

FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT ABSOLUTE TEST METHOD, MASS POINT ANALYSIS RESULTS

| Time (hh:mm) | Mass (LbM) | Leakage (PCT./DAY) | Confidence (PCT./DAY) | UCL (PCT./DAY) |
|---|---|---|---|---|
| 04:30 | 843496.89 | 0.036129 | 0.004465 | 0.040594 |
| 04:45 | 843488.06 | 0.036735 | 0.004291 | 0.041026 |
| 05:00 | 843507.86 | 0.036430 | 0.004100 | 0.040529 |
| 05:15 | 843472.37 | 0.037277 | 0.003997 | 0.041274 |
| 05:30 | 843492.77 | 0.037236 | 0.003817 | 0.041053 |
| 05:45 | 843487.93 | 0.037250 | 0.003649 | 0.040899 |
| 06:00 | 843501.34 | 0.036757 | 0.003525 | 0.040281 |
| 06:15 | 843502.62 | 0.036192 | 0.003420 | 0.039612 |
| 06:30 | 843484.22 | 0.036117 | 0.003280 | 0.039398 |
| 06:45 | 843481.11 | 0.036050 | 0.003148 | 0.039198 |
| 07:00 | 843457.19 | 0.036524 | 0.003058 | 0.039582 |
| 07:15 | 843465.68 | 0.036656 | 0.002942 | 0.039598 |
| 07:30 | 843482.46 | 0.036297 | 0.002851 | 0.039148 |
| 07:45 | 843467.70 | 0.036241 | 0.002745 | 0.038987 |
| 08:00 | 843488.56 | 0.035659 | 0.002704 | 0.038363 |
| 08:15 | 843450.10 | 0.035893 | 0.002616 | 0.038509 |
| 08:30 | 843443.91 | 0.036165 | 0.002537 | 0.038702 |
| 08:45 | 843445.76 | 0.036310 | 0.002453 | 0.038763 |
| 09:00 | 843453.03 | 0.036239 | 0.002370 | 0.038609 |
| 09:15 | 843432.85 | 0.036492 | 0.002303 | 0.038795 |
| 09:30 | 843431.13 | 0.036693 | 0.002236 | 0.038929 |
| 09:45 | 843408.29 | 0.037219 | 0.002221 | 0.039441 |
| 10:00 | 843429.85 | 0.037276 | 0.002151 | 0.039427 |
| 10:15 | 843432.31 | 0.037234 | 0.002084 | 0.039317 |
| 10:30 | 843408.78 | 0.037517 | 0.002038 | 0.039555 |
| 10:45 | 843391.12 | 0.037998 | 0.002029 | 0.040027 |
| 11:00 | 843385.70 | 0.038468 | 0.002019 | 0.040487 |
| 11:15 | 843373.77 | 0.039022 | 0.002031 | 0.041052 |
| 11:30 | 843375.21 | 0.039460 | 0.002016 | 0.041476 |
| 11:45 | 843374.22 | 0.039828 | 0.001990 | 0.041818 |
| 12:00 | 843367.01 | 0.040215 | 0.001969 | 0.042184 |
| 12:15 | 843341.19 | 0.040860 | 0.002012 | 0.042872 |
| 12:30 | 843358.51 | 0.041189 | 0.001982 | 0.043172 |
| 12:45 | 843311.09 | 0.042032 | 0.002092 | 0.044123 |
| 13:00 | 843349.11 | 0.042309 | 0.002053 | 0.044361 |
| 13:15 | 843329.32 | 0.042752 | 0.002043 | 0.044795 |
| 13:30 | 843334.89 | 0.043055 | 0.002011 | 0.045067 |
| 13:45 | 843325.01 | 0.043404 | 0.001988 | 0.045391 |
| 14:00 | 843331.52 | 0.043615 | 0.001948 | 0.045562 |
| 14:15 | 843317.38 | 0.043919 | 0.001921 | 0.045840 |

ATTACHMENT 3.3C (Cont.)

INDIAN POINT 2 1987

FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT ABSOLUTE TEST METHOD, MASS POINT ANALYSIS RESULTS

| Time (hh:mm) | Mass (LbM) | Leakage (PCT./DAY) | Confidence (PCT./DAY) | UCL (PCT./DAY) |
|---|---|---|---|---|
| 14:30 | 843305.48 | 0.044283 | 0.001906 | 0.046189 |
| 14:45 | 843322.22 | 0.044415 | 0.001863 | 0.046279 |
| 15:00 | 843307.76 | 0.044641 | 0.001831 | 0.046472 |
| 15:15 | 843311.31 | 0.044780 | 0.001792 | 0.046572 |
| 15:30 | 843307.48 | 0.044908 | 0.001754 | 0.046662 |
| 15:45 | 843272.14 | 0.045314 | 0.001757 | 0.047070 |
| 16:00 | 843284.29 | 0.045548 | 0.001731 | 0.047279 |
| 16:15 | 843302.20 | 0.045576 | 0.001692 | 0.047268 |
| 16:30 | 843251.41 | 0.046001 | 0.001703 | 0.047704 |
| 16:45 | 843294.91 | 0.046002 | 0.001665 | 0.047667 |
| 17:00 | 843266.39 | 0.046202 | 0.001639 | 0.047842 |
| 17:15 | 843287.38 | 0.046190 | 0.001604 | 0.047794 |
| 17:30 | 843278.84 | 0.046214 | 0.001569 | 0.047783 |
| 17:45 | 843279.02 | 0.046203 | 0.001536 | 0.047739 |
| 18:00 | 843262.92 | 0.046284 | 0.001505 | 0.047789 |
| 18:15 | 843259.31 | 0.046356 | 0.001475 | 0.047831 |
| 18:30 | 843275.39 | 0.046279 | 0.001447 | 0.047725 |

ATTACHMENT 3.3D

INDIAN POINT 2 1987

FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT ABSOLUTE TEST METHOD, TOTAL TIME ANALYSIS TEST RESULTS

| Time (hh:mm) | Mass (LbM) | Meas.Leak. (PCT./DAY) | Calc.Leak. (PCT./DAY) | Confidence (PCT./DAY) | UCL (PCT./DAY) |
|---|---|---|---|---|---|
| 18:30 | 843649.88 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 18:45 | 843619.03 | 0.351065 | 0.000000 | 0.000000 | 0.000000 |
| 19:00 | 843623.74 | 0.148696 | 0.000000 | 0.000000 | 0.000000 |
| 19:15 | 843632.67 | 0.065263 | 0.045440 | 0.470385 | 0.515825 |
| 19:30 | 843605.67 | 0.125761 | 0.058794 | 0.467155 | 0.525950 |
| 19:45 | 843599.99 | 0.113536 | 0.061265 | 0.347673 | 0.408939 |
| 20:00 | 843596.79 | 0.100685 | 0.058200 | 0.281527 | 0.339727 |
| 20:15 | 843608.86 | 0.066672 | 0.042283 | 0.234903 | 0.277186 |
| 20:30 | 843613.54 | 0.051690 | 0.027433 | 0.204987 | 0.232420 |
| 20:45 | 843605.80 | 0.055733 | 0.020260 | 0.187214 | 0.207474 |
| 21:00 | 843599.93 | 0.056835 | 0.016590 | 0.175351 | 0.191941 |
| 21:15 | 843583.60 | 0.068560 | 0.018429 | 0.168990 | 0.187419 |
| 21:30 | 843601.36 | 0.046010 | 0.013718 | 0.159573 | 0.173292 |
| 21:45 | 843618.85 | 0.027156 | 0.005477 | 0.150376 | 0.155853 |
| 22:00 | 843587.23 | 0.050918 | 0.005672 | 0.146321 | 0.151993 |
| 22:15 | 843608.84 | 0.031131 | 0.001415 | 0.140409 | 0.141824 |
| 22:30 | 843609.68 | 0.028588 | -0.002233 | 0.135440 | 0.133207 |
| 22:45 | 843635.57 | 0.009581 | -0.008993 | 0.130018 | 0.121025 |
| 23:00 | 843593.34 | 0.035740 | -0.008906 | 0.128002 | 0.119096 |
| 23:15 | 843572.92 | 0.046092 | -0.006585 | 0.127386 | 0.120801 |
| 23:30 | 843564.56 | 0.048545 | -0.003988 | 0.126760 | 0.122772 |
| 23:45 | 843546.32 | 0.056117 | -0.000281 | 0.126704 | 0.126422 |
| 00:00 | 843552.68 | 0.050272 | 0.002025 | 0.125562 | 0.127587 |
| 00:15 | 843520.55 | 0.063985 | 0.006366 | 0.125643 | 0.132009 |
| 00:30 | 843569.04 | 0.038328 | 0.006199 | 0.123209 | 0.129409 |
| 00:45 | 843553.41 | 0.043909 | 0.006998 | 0.121317 | 0.128315 |
| 01:00 | 843537.55 | 0.049162 | 0.008549 | 0.119856 | 0.128406 |
| 01:15 | 843545.34 | 0.044058 | 0.009275 | 0.118086 | 0.127360 |
| 01:30 | 843529.62 | 0.048872 | 0.010640 | 0.116672 | 0.127312 |
| 01:45 | 843541.57 | 0.042498 | 0.011078 | 0.114937 | 0.126016 |
| 02:00 | 843534.21 | 0.043873 | 0.011704 | 0.113358 | 0.125061 |
| 02:15 | 843543.45 | 0.039066 | 0.011725 | 0.111641 | 0.123367 |
| 02:30 | 843552.92 | 0.034478 | 0.011249 | 0.109863 | 0.121112 |
| 02:45 | 843536.12 | 0.039226 | 0.011419 | 0.108370 | 0.119789 |
| 03:00 | 843514.08 | 0.045450 | 0.012318 | 0.107208 | 0.119526 |
| 03:15 | 843548.44 | 0.032979 | 0.011805 | 0.105632 | 0.117438 |
| 03:30 | 843504.63 | 0.045911 | 0.012758 | 0.104608 | 0.117366 |
| 03:45 | 843495.64 | 0.047435 | 0.013816 | 0.103660 | 0.117476 |
| 04:00 | 843525.37 | 0.037285 | 0.013786 | 0.102365 | 0.116151 |

ATTACHMENT 3.3D (Cont.)

INDIAN POINT 2 1987

FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT ABSOLUTE TEST METHOD, TOTAL TIME ANALYSIS TEST RESULTS

| Time (hh:mm) | Mass (LbM) | Meas.Leak. (PCT./DAY) | Calc.Leak. (PCT./DAY) | Confidence (PCT./DAY) | UCL (PCT./DAY) |
|---|---|---|---|---|---|
| 04:15 | 843522.05 | 0.037297 | 0.013790 | 0.101134 | 0.114924 |
| 04:30 | 843496.89 | 0.043521 | 0.014422 | 0.100153 | 0.114574 |
| 04:45 | 843488.06 | 0.044911 | 0.015159 | 0.099242 | 0.114401 |
| 05:00 | 843507.86 | 0.038477 | 0.015269 | 0.098156 | 0.113426 |
| 05:15 | 843472.37 | 0.046973 | 0.016158 | 0.097369 | 0.113527 |
| 05:30 | 843492.77 | 0.040632 | 0.016443 | 0.096398 | 0.112841 |
| 05:45 | 843487.93 | 0.040951 | 0.016754 | 0.095468 | 0.112221 |
| 06:00 | 843501.34 | 0.036744 | 0.016707 | 0.094469 | 0.111175 |
| 06:15 | 843502.62 | 0.035654 | 0.016591 | 0.093487 | 0.110078 |
| 06:30 | 843484.22 | 0.039272 | 0.016794 | 0.092622 | 0.109415 |
| 06:45 | 843481.11 | 0.039192 | 0.016992 | 0.091782 | 0.108774 |
| 07:00 | 843457.19 | 0.043853 | 0.017555 | 0.091081 | 0.108636 |
| 07:15 | 843465.68 | 0.041098 | 0.017884 | 0.090324 | 0.108208 |
| 07:30 | 843482.46 | 0.036637 | 0.017872 | 0.089497 | 0.107369 |
| 07:45 | 843467.70 | 0.039115 | 0.018057 | 0.088744 | 0.106801 |
| 08:00 | 843488.56 | 0.033995 | 0.017873 | 0.087924 | 0.105797 |
| 08:15 | 843450.10 | 0.041334 | 0.018232 | 0.087268 | 0.105500 |
| 08:30 | 843443.91 | 0.041852 | 0.018616 | 0.086636 | 0.105252 |
| 08:45 | 843445.76 | 0.040750 | 0.018913 | 0.085994 | 0.104907 |
| 09:00 | 843453.03 | 0.038621 | 0.019060 | 0.085327 | 0.104387 |
| 09:15 | 843432.85 | 0.041857 | 0.019422 | 0.084737 | 0.104159 |
| 09:30 | 843431.13 | 0.041486 | 0.019748 | 0.084151 | 0.103900 |
| 09:45 | 843408.29 | 0.045066 | 0.020295 | 0.083648 | 0.103942 |
| 10:00 | 843429.85 | 0.040382 | 0.020524 | 0.083059 | 0.103583 |
| 10:15 | 843432.31 | 0.039298 | 0.020682 | 0.082466 | 0.103148 |
| 10:30 | 843408.78 | 0.042867 | 0.021057 | 0.081947 | 0.103004 |
| 10:45 | 843391.12 | 0.045300 | 0.021566 | 0.081481 | 0.103047 |
| 11:00 | 843385.70 | 0.045547 | 0.022071 | 0.081022 | 0.103093 |
| 11:15 | 843373.77 | 0.046894 | 0.022634 | 0.080592 | 0.103226 |
| 11:30 | 843375.21 | 0.045963 | 0.023123 | 0.080145 | 0.103268 |
| 11:45 | 843374.22 | 0.045460 | 0.023564 | 0.079693 | 0.103257 |
| 12:00 | 843367.01 | 0.045982 | 0.024019 | 0.079253 | 0.103272 |
| 12:15 | 843341.19 | 0.049473 | 0.024649 | 0.078879 | 0.103529 |
| 12:30 | 843358.51 | 0.046049 | 0.025069 | 0.078444 | 0.103513 |
| 12:45 | 843311.09 | 0.052810 | 0.025837 | 0.078134 | 0.103971 |
| 13:00 | 843349.11 | 0.046249 | 0.026226 | 0.077703 | 0.103929 |
| 13:15 | 843329.32 | 0.048636 | 0.026727 | 0.077314 | 0.104041 |
| 13:30 | 843334.89 | 0.047163 | 0.027133 | 0.076903 | 0.104036 |
| 13:45 | 843325.01 | 0.048010 | 0.027569 | 0.076508 | 0.104076 |

ATTACHMENT 3.3D (Cont.)

INDIAN POINT 2 1987

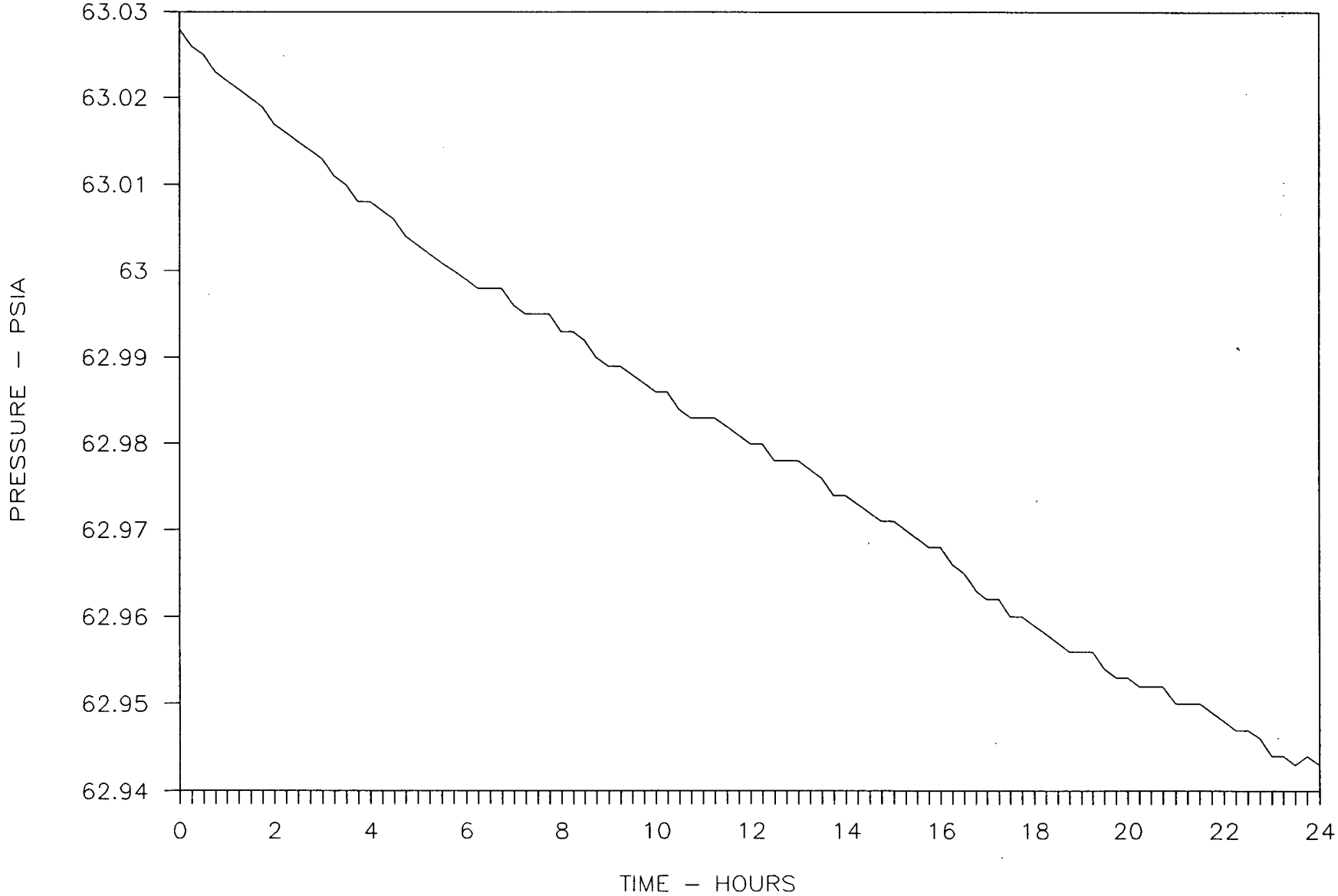
FROM 18:30 HOURS ON 12/21/87 TO 18:30 HOURS ON 12/22/87

ILRT ABSOLUTE TEST METHOD, TOTAL TIME ANALYSIS TEST RESULTS

| Time (hh:mm) | Mass (LbM) | Meas.Leak. (PCT./DAY) | Calc.Leak. (PCT./DAY) | Confidence (PCT./DAY) | UCL (PCT./DAY) |
|---|---|---|---|---|---|
| 14:00 | 843331.52 | 0.046444 | 0.027910 | 0.076094 | 0.104004 |
| 14:15 | 843317.38 | 0.047892 | 0.028312 | 0.075704 | 0.104016 |
| 14:30 | 843305.48 | 0.048987 | 0.028755 | 0.075332 | 0.104087 |
| 14:45 | 843322.22 | 0.046030 | 0.029038 | 0.074924 | 0.103963 |
| 15:00 | 843307.76 | 0.047476 | 0.029382 | 0.074539 | 0.103922 |
| 15:15 | 843311.31 | 0.046418 | 0.029666 | 0.074145 | 0.103811 |
| 15:30 | 843307.48 | 0.046383 | 0.029938 | 0.073756 | 0.103695 |
| 15:45 | 843272.14 | 0.050568 | 0.030397 | 0.073423 | 0.103820 |
| 16:00 | 843284.29 | 0.048373 | 0.030739 | 0.073063 | 0.103803 |
| 16:15 | 843302.20 | 0.045475 | 0.030940 | 0.072676 | 0.103616 |
| 16:30 | 843251.41 | 0.051526 | 0.031405 | 0.072363 | 0.103769 |
| 16:45 | 843294.91 | 0.045384 | 0.031584 | 0.071983 | 0.103567 |
| 17:00 | 843266.39 | 0.048486 | 0.031894 | 0.071639 | 0.103533 |
| 17:15 | 843287.38 | 0.045328 | 0.032058 | 0.071268 | 0.103326 |
| 17:30 | 843278.84 | 0.045892 | 0.032242 | 0.070907 | 0.103149 |
| 17:45 | 843279.02 | 0.045376 | 0.032400 | 0.070547 | 0.102947 |
| 18:00 | 843262.92 | 0.046844 | 0.032615 | 0.070205 | 0.102820 |
| 18:15 | 843259.31 | 0.046783 | 0.032822 | 0.069866 | 0.102688 |
| 18:30 | 843275.39 | 0.044389 | 0.032925 | 0.069513 | 0.102438 |

# CONTAINMENT PRESSURE vs. TIME

INDIAN POINT 2 – ILRT – DECEMBER 1987

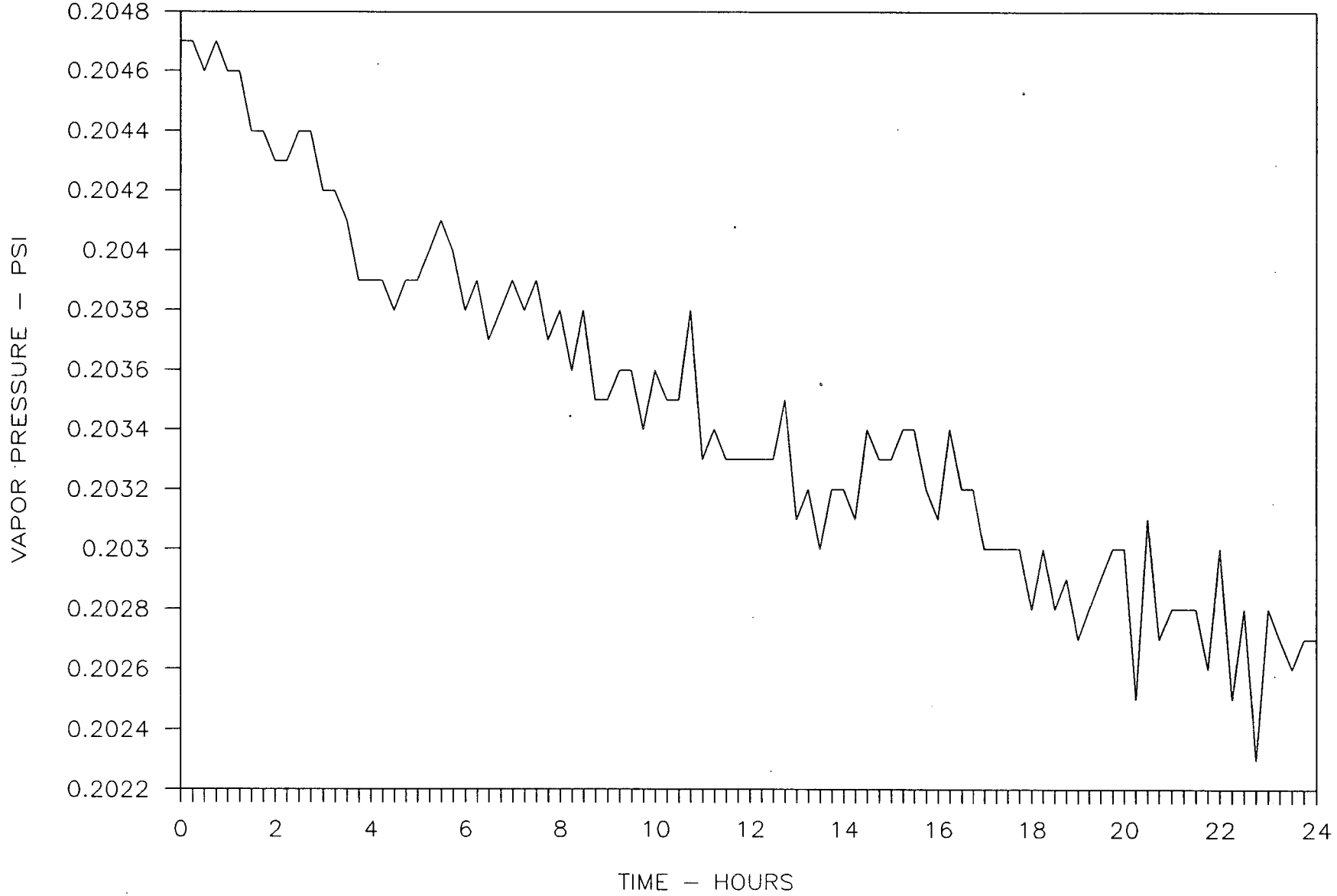



**ATTACHMENT 3.3E**

**GRAPH 4**

# CONTAINMENT VAPOR PRESSURE vs. TIME

INDIAN POINT 2 – ILRT – DECEMBER 1987

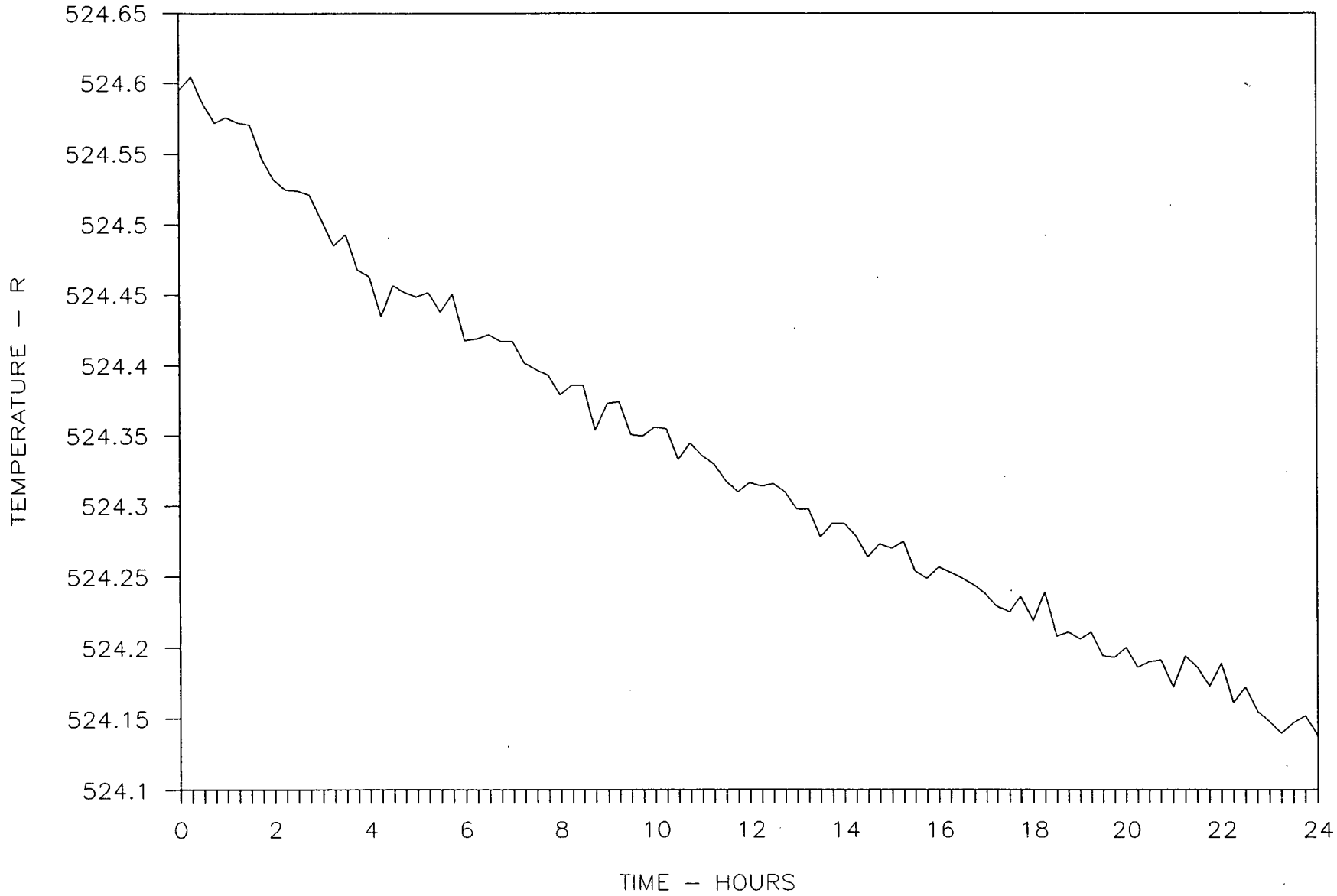



**ATTACHMENT 3.3F**

**GRAPH 5**

# CONTAINMENT TEMPERATURE vs. TIME

INDIAN POINT 2 – ILRT – DECEMBER 1987

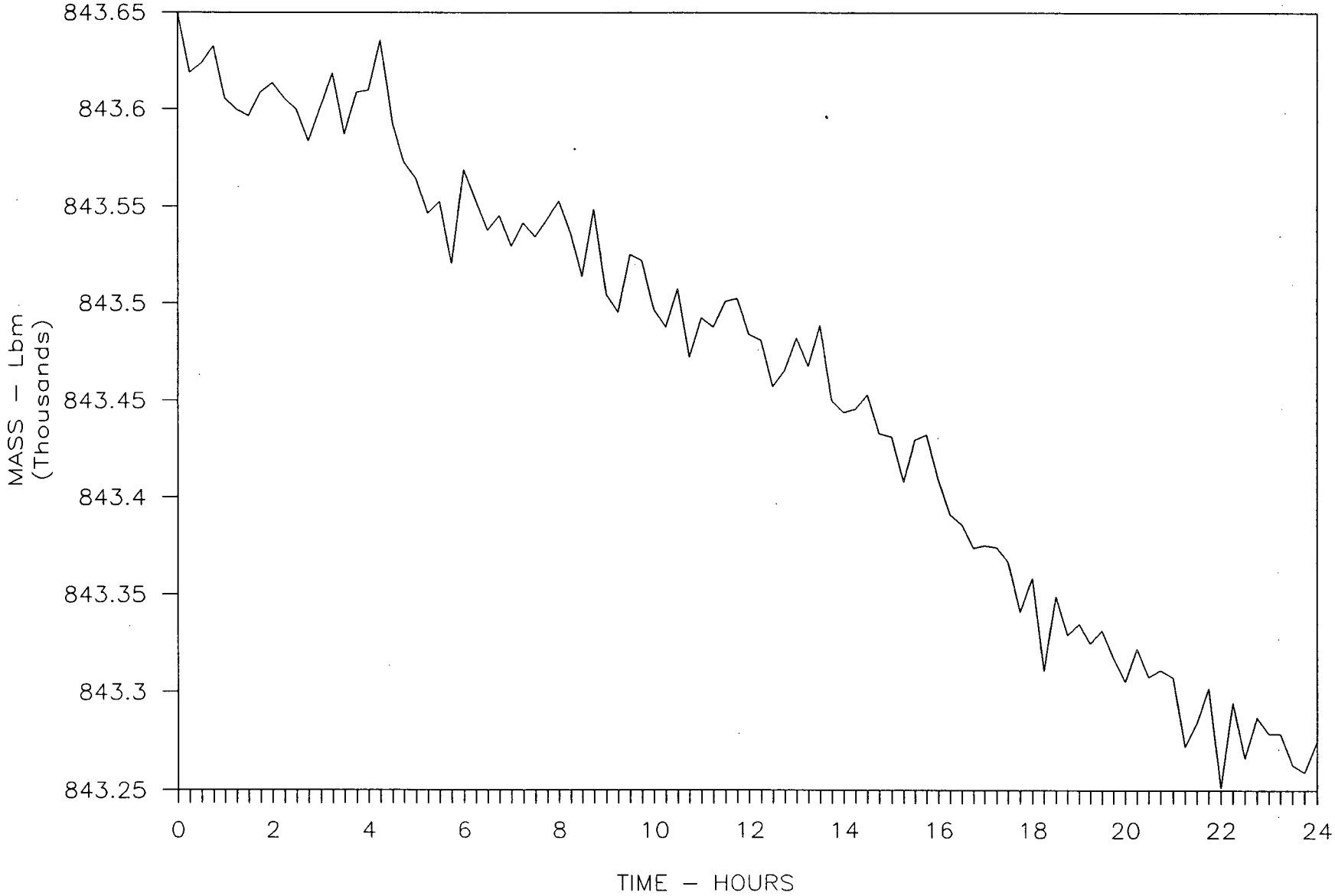



**ATTACHMENT 3.3G**

**GRAPH 6**

# CONTAINMENT MASS vs. TIME

INDIAN POINT 2 – ILRT – DECEMBER 1987

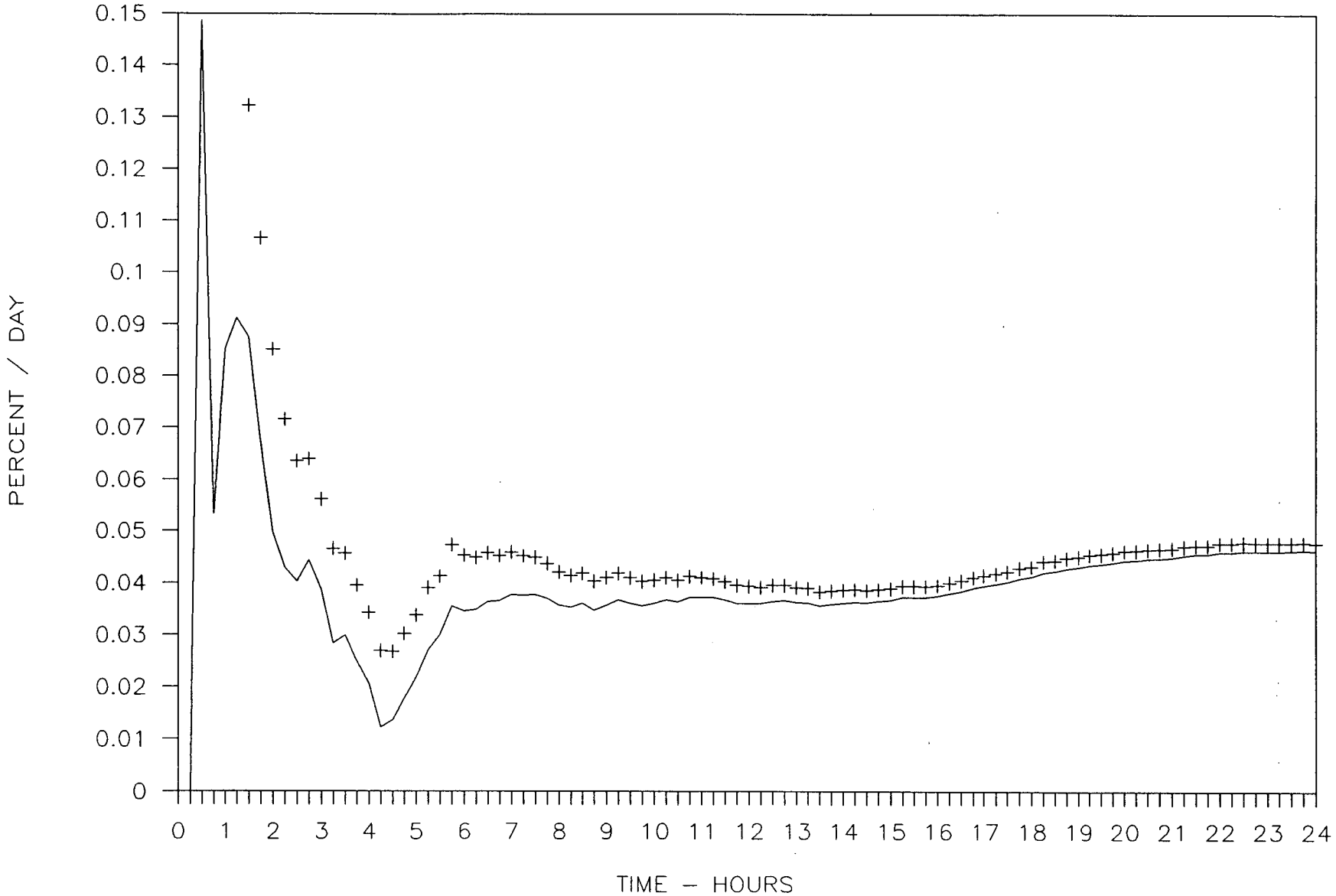



**ATTACHMENT 3.3H**

**GRAPH 7**

# MASS POINT LEAKAGE & UCL

INDIAN POINT 2 – ILRT – DECEMBER 1987

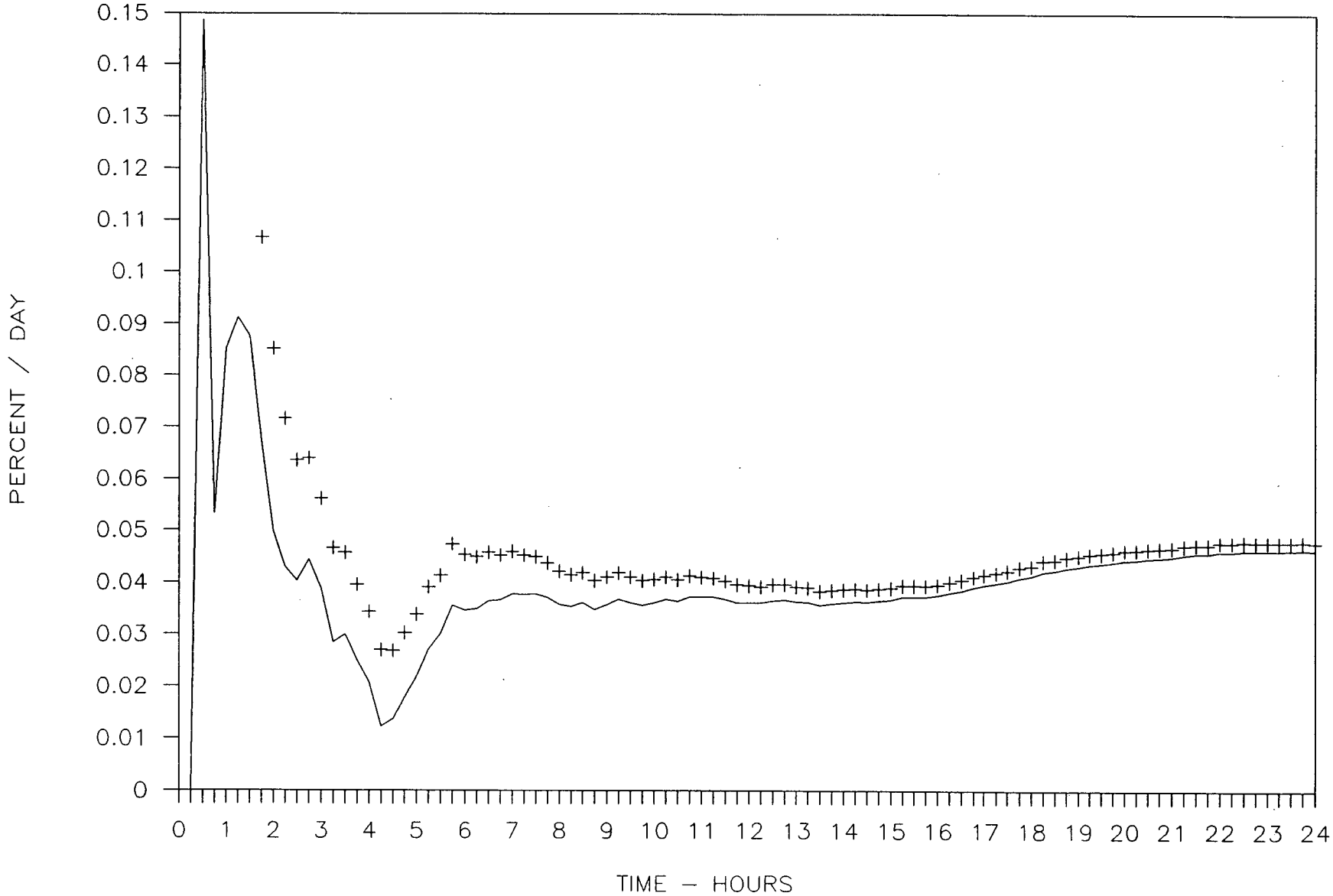



**ATTACHMENT 3.3I**

**GRAPH 8**

# TOTAL TIME LEAKAGE & UCL

INDIAN POINT 2 – ILRT – DECEMBER 1987




**ATTACHMENT 3.3J**

**GRAPH 9**

ATTACHMENT 3.3K

INDIAN POINT 2 1987
FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST MEASURED INPUT DATA

12/22/87 19:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.790 | 63.860 | 63.790 | 64.090 | 64.310 | 63.690 | 63.600 | 63.690 | 63.940 | 64.310 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.880 | 63.880 | 63.820 | 64.130 | 63.860 | 64.500 | 64.350 | 64.220 | 64.260 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.430 | 63.530 | 67.000 | 67.000 | 64.060 | 63.910 | 67.000 | 64.000 | 64.020 | 64.000 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.910 | 63.890 | 71.930 | 63.940 | 67.000 | 71.470 | 67.060 | 64.170 | 67.150 | 64.900 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.580 | 66.540 | 67.910 | 67.590 | 66.890 | 68.010 | 65.160 | 61.220 | 60.000 | 59.390 |
| C140 | C160 | | | | | | | | |
| 62.928 | 62.950 | | | | | | | | |

12/22/87 20:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.770 | 63.770 | 63.790 | 64.090 | 64.280 | 63.820 | 63.710 | 63.710 | 64.090 | 64.370 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.860 | 63.980 | 63.880 | 64.070 | 63.900 | 64.500 | 64.410 | 64.350 | 64.260 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.380 | 63.530 | 67.000 | 67.000 | 64.060 | 63.910 | 67.000 | 64.000 | 64.020 | 63.910 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.890 | 63.850 | 71.930 | 63.940 | 67.000 | 71.220 | 67.060 | 64.210 | 67.150 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.650 | 66.540 | 67.860 | 67.580 | 66.810 | 68.010 | 65.160 | 61.220 | 60.000 | 59.400 |
| C140 | C160 | | | | | | | | |
| 62.928 | 62.950 | | | | | | | | |

ATTACHMENT 3.3K (Cont.)

INDIAN POINT 2 1987
FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST MEASURED INPUT DATA

12/22/87 20:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.820 | 63.860 | 63.790 | 64.070 | 64.320 | 63.820 | 63.660 | 63.660 | 64.030 | 64.260 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.880 | 63.900 | 63.840 | 63.900 | 64.130 | 63.880 | 64.520 | 64.280 | 64.260 | 64.260 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.430 | 63.570 | 67.000 | 67.000 | 64.080 | 63.870 | 67.000 | 64.080 | 64.060 | 63.980 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.830 | 63.960 | 71.910 | 64.000 | 67.000 | 71.480 | 67.060 | 64.170 | 67.150 | 64.890 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.580 | 66.540 | 67.830 | 67.590 | 66.960 | 67.950 | 65.190 | 61.220 | 60.000 | 59.320 |
| C140 | C160 | | | | | | | | |
| 62.927 | 62.949 | | | | | | | | |

12/22/87 20:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.790 | 63.730 | 63.750 | 64.090 | 64.280 | 63.690 | 63.660 | 63.580 | 63.900 | 64.220 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.900 | 63.880 | 63.940 | 63.880 | 64.090 | 63.820 | 64.390 | 64.280 | 64.310 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.440 | 63.490 | 67.000 | 67.000 | 64.110 | 63.980 | 67.000 | 63.980 | 64.060 | 63.890 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.870 | 63.870 | 71.930 | 63.960 | 67.000 | 71.390 | 67.060 | 64.150 | 67.150 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.630 | 66.540 | 67.900 | 67.570 | 66.850 | 67.930 | 65.170 | 61.220 | 60.000 | 59.320 |
| C140 | C160 | | | | | | | | |
| 62.926 | 62.948 | | | | | | | | |

ATTACHMENT 3.3K (Cont.)

INDIAN POINT 2 1987
FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST MEASURED INPUT DATA

12/22/87 20:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.820 | 63.880 | 63.770 | 64.110 | 64.330 | 63.840 | 63.710 | 63.670 | 63.940 | 64.240 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.940 | 63.880 | 63.900 | 63.920 | 64.140 | 63.920 | 64.560 | 64.710 | 64.310 | 64.310 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.220 | 63.470 | 67.000 | 67.000 | 64.080 | 63.940 | 67.000 | 63.960 | 64.020 | 64.000 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.940 | 63.890 | 71.910 | 63.940 | 67.000 | 71.480 | 67.060 | 64.170 | 67.150 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.560 | 66.540 | 67.790 | 67.550 | 66.940 | 67.930 | 65.180 | 61.220 | 60.000 | 59.370 |
| C140 | C160 | | | | | | | | |
| 62.925 | 62.947 | | | | | | | | |

12/22/87 21:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.790 | 63.880 | 63.790 | 64.090 | 64.310 | 63.770 | 63.710 | 63.660 | 64.010 | 64.410 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.900 | 63.860 | 63.790 | 63.840 | 64.110 | 63.900 | 64.520 | 64.350 | 64.220 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.430 | 63.530 | 67.000 | 67.000 | 64.060 | 63.850 | 67.000 | 64.020 | 64.040 | 63.910 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.780 | 63.890 | 71.910 | 63.980 | 67.000 | 71.500 | 67.060 | 64.170 | 67.150 | 64.910 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.530 | 66.540 | 67.900 | 67.650 | 66.860 | 68.070 | 65.190 | 61.220 | 60.000 | 59.390 |
| C140 | C160 | | | | | | | | |
| 62.924 | 62.946 | | | | | | | | |

ATTACHMENT 3.3K (Cont.)

INDIAN POINT 2 1987
FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST MEASURED INPUT DATA

12/22/87 21:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.820 | 63.840 | 63.750 | 64.090 | 64.280 | 63.750 | 63.580 | 63.650 | 63.980 | 64.200 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.880 | 63.840 | 63.790 | 63.790 | 64.070 | 63.790 | 64.430 | 64.320 | 64.320 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.440 | 63.510 | 67.000 | 67.000 | 64.110 | 63.910 | 67.000 | 63.960 | 64.060 | 63.850 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.890 | 63.870 | 71.910 | 63.980 | 67.000 | 71.150 | 67.060 | 64.150 | 67.150 | 64.930 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.530 | 66.540 | 67.810 | 67.570 | 66.940 | 67.970 | 65.180 | 61.220 | 60.000 | 59.390 |
| C140 | C160 | | | | | | | | |
| 62.923 | 62.944 | | | | | | | | |

12/22/87 21:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.770 | 63.770 | 63.770 | 64.100 | 64.330 | 63.770 | 63.710 | 63.710 | 64.110 | 64.220 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.920 | 63.840 | 63.900 | 63.840 | 64.050 | 63.840 | 64.560 | 64.630 | 64.370 | 64.270 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.400 | 63.420 | 67.000 | 67.000 | 64.040 | 63.910 | 67.000 | 63.890 | 64.040 | 63.980 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.910 | 63.870 | 71.910 | 63.910 | 67.000 | 71.390 | 67.060 | 64.170 | 67.150 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.580 | 66.540 | 67.880 | 67.620 | 67.010 | 68.010 | 65.210 | 61.220 | 60.000 | 59.350 |
| C140 | C160 | | | | | | | | |
| 62.921 | 62.943 | | | | | | | | |

ATTACHMENT 3.3K (Cont.)

INDIAN POINT 2 1987
FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST MEASURED INPUT DATA

12/22/87 21:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.770 | 63.840 | 63.790 | 64.090 | 64.280 | 63.750 | 63.690 | 63.710 | 63.920 | 64.280 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.920 | 63.840 | 63.940 | 63.900 | 64.110 | 63.840 | 64.450 | 64.390 | 64.260 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.430 | 63.510 | 67.000 | 67.000 | 64.080 | 63.960 | 67.000 | 63.940 | 64.020 | 63.960 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 64.000 | 63.940 | 71.910 | 63.940 | 67.000 | 71.440 | 67.060 | 64.210 | 67.150 | 64.910 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.600 | 66.540 | 67.900 | 67.590 | 66.880 | 68.050 | 65.210 | 61.220 | 60.000 | 59.370 |
| C140 | C160 | | | | | | | | |
| 62.919 | 62.943 | | | | | | | | |

12/22/87 22:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.790 | 63.860 | 63.750 | 64.070 | 64.310 | 63.750 | 63.690 | 63.660 | 64.010 | 64.350 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.900 | 63.840 | 63.840 | 63.820 | 64.110 | 63.880 | 64.450 | 64.370 | 64.310 | 64.200 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.380 | 63.510 | 67.000 | 67.000 | 64.080 | 63.870 | 67.000 | 63.960 | 64.040 | 63.910 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.960 | 63.890 | 71.930 | 63.960 | 67.000 | 71.460 | 67.060 | 64.190 | 67.150 | 64.940 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.570 | 66.540 | 67.930 | 67.540 | 66.890 | 68.080 | 65.250 | 61.220 | 60.000 | 59.390 |
| C140 | C160 | | | | | | | | |
| 62.919 | 62.940 | | | | | | | | |

ATTACHMENT 3.3K (Cont.)

INDIAN POINT 2 1987
FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST MEASURED INPUT DATA

12/22/87 22:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.790 | 63.860 | 63.770 | 64.090 | 64.280 | 63.730 | 63.660 | 63.660 | 63.880 | 64.280 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.880 | 63.820 | 63.880 | 63.820 | 64.070 | 63.840 | 64.450 | 64.280 | 64.200 | 64.180 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.360 | 63.470 | 67.000 | 67.000 | 64.060 | 63.910 | 67.000 | 64.020 | 64.040 | 63.910 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.850 | 63.870 | 71.890 | 63.980 | 67.000 | 71.470 | 67.060 | 64.170 | 67.140 | 64.890 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.550 | 66.540 | 67.930 | 67.660 | 67.010 | 68.100 | 65.240 | 61.220 | 60.000 | 59.440 |
| C140 | C160 | | | | | | | | |
| 62.919 | 62.939 | | | | | | | | |

12/22/87 22:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.770 | 63.790 | 63.770 | 64.090 | 64.320 | 63.730 | 63.690 | 63.730 | 63.940 | 64.200 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.920 | 63.840 | 63.860 | 63.820 | 64.090 | 63.790 | 64.450 | 64.320 | 64.390 | 64.280 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.320 | 63.510 | 67.000 | 67.000 | 64.060 | 63.960 | 67.000 | 63.960 | 64.020 | 63.830 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.870 | 63.890 | 71.760 | 63.940 | 67.000 | 71.480 | 67.060 | 64.170 | 67.140 | 64.950 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.620 | 66.540 | 67.940 | 67.640 | 67.020 | 68.050 | 65.250 | 61.220 | 60.000 | 59.410 |
| C140 | C160 | | | | | | | | |
| 62.918 | 62.938 | | | | | | | | |

ATTACHMENT 3.3K (Cont.)

INDIAN POINT 2 1987
FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST MEASURED INPUT DATA

12/22/87 22:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.790 | 63.860 | 63.790 | 64.090 | 64.350 | 63.770 | 63.660 | 63.650 | 63.900 | 64.220 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.920 | 63.840 | 63.980 | 63.920 | 64.090 | 63.820 | 64.370 | 64.320 | 64.350 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.270 | 63.440 | 67.000 | 67.000 | 64.080 | 63.940 | 67.000 | 63.960 | 64.040 | 63.850 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.890 | 64.000 | 71.870 | 63.940 | 67.000 | 71.440 | 67.060 | 64.170 | 67.140 | 64.980 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.610 | 66.540 | 67.920 | 67.630 | 67.010 | 68.040 | 65.240 | 61.220 | 60.000 | 59.370 |
| C140 | C160 | | | | | | | | |
| 62.918 | 62.938 | | | | | | | | |

12/22/87 23:00

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.790 | 63.860 | 63.790 | 64.090 | 64.310 | 63.790 | 63.690 | 63.660 | 63.940 | 64.350 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.880 | 63.880 | 63.840 | 63.920 | 64.110 | 63.920 | 64.430 | 64.410 | 64.280 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.340 | 63.440 | 67.000 | 67.000 | 64.080 | 63.890 | 67.000 | 63.940 | 64.020 | 63.980 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.850 | 63.910 | 71.870 | 63.940 | 67.000 | 71.140 | 67.060 | 64.190 | 67.140 | 65.000 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.610 | 66.540 | 67.940 | 67.620 | 66.870 | 68.030 | 65.240 | 61.220 | 60.000 | 59.360 |
| C140 | C160 | | | | | | | | |
| 62.917 | 62.938 | | | | | | | | |

ATTACHMENT 3.3K (Cont.)

INDIAN POINT 2 1987
FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST MEASURED INPUT DATA

12/22/87 23:15

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.790 | 63.880 | 63.770 | 64.090 | 64.320 | 63.790 | 63.730 | 63.710 | 63.940 | 64.240 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.860 | 63.860 | 63.860 | 63.880 | 64.110 | 63.860 | 64.410 | 64.280 | 64.130 | 64.200 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.400 | 63.460 | 67.000 | 67.000 | 64.060 | 63.910 | 67.000 | 64.060 | 64.080 | 63.820 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.820 | 63.910 | 71.780 | 64.010 | 67.000 | 71.460 | 67.060 | 64.160 | 67.140 | 64.890 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.490 | 66.540 | 67.770 | 67.630 | 66.950 | 68.000 | 65.230 | 61.220 | 60.000 | 59.330 |
| C140 | C160 | | | | | | | | |
| 62.916 | 62.936 | | | | | | | | |

12/22/87 23:30

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.800 | 63.860 | 63.750 | 64.100 | 64.350 | 63.750 | 63.650 | 63.690 | 64.010 | 64.200 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.880 | 63.840 | 63.880 | 63.840 | 64.100 | 63.880 | 64.350 | 64.330 | 64.180 | 64.200 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.360 | 63.460 | 67.000 | 67.000 | 64.060 | 63.840 | 67.000 | 63.990 | 64.060 | 63.860 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.840 | 63.950 | 71.900 | 63.950 | 67.000 | 71.350 | 67.060 | 64.140 | 67.140 | 64.940 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.540 | 66.540 | 67.910 | 67.660 | 67.010 | 68.090 | 65.240 | 61.220 | 60.000 | 59.450 |
| C140 | C160 | | | | | | | | |
| 62.914 | 62.935 | | | | | | | | |

ATTACHMENT 3.3K (Cont.)

INDIAN POINT 2 1987
FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED IMPOSED VERIFICATION TEST MEASURED INPUT DATA

12/22/87 23:45

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| C0 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 |
| 63.800 | 63.840 | 63.800 | 64.100 | 64.310 | 63.690 | 63.670 | 63.710 | 63.970 | 64.200 |
| C10 | C11 | C12 | C13 | C14 | C15 | C16 | C17 | C18 | C19 |
| 63.880 | 63.820 | 63.940 | 63.920 | 64.140 | 63.770 | 64.480 | 64.310 | 64.310 | 64.240 |
| C40 | C41 | C102 | C103 | C44 | C45 | C46 | C47 | C48 | C49 |
| 64.400 | 63.400 | 67.000 | 67.000 | 64.080 | 63.940 | 67.000 | 63.910 | 64.020 | 63.870 |
| C50 | C51 | C52 | C53 | C100 | C104 | C56 | C57 | C58 | C101 |
| 63.870 | 63.890 | 71.930 | 63.940 | 67.000 | 71.410 | 67.060 | 64.190 | 67.140 | 64.930 |
| C110 | C111 | C112 | C113 | C114 | C115 | C116 | C117 | C118 | C119 |
| 67.560 | 66.540 | 67.990 | 67.630 | 67.010 | 68.090 | 65.260 | 61.220 | 60.000 | 59.490 |
| C140 | C160 | | | | | | | | |
| 62.913 | 62.934 | | | | | | | | |

ATTACHMENT 3.3L

INDIAN POINT 2 1987

FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST

REDUCED INPUT VARIABLES

| Time (hh:mm) | Press. (PSIA) | V.P. (PSI) | Temp. (R) | Dewpoint (V) | Mass (LbM) |
|---|---|---|---|---|---|
| 19:45 | 62.939 | 0.2028 | 524.140 | 0.203 | 843217.28 |
| 20:00 | 62.939 | 0.2026 | 524.150 | 0.203 | 843202.90 |
| 20:15 | 62.938 | 0.2027 | 524.151 | 0.203 | 843187.69 |
| 20:30 | 62.937 | 0.2024 | 524.126 | 0.202 | 843218.50 |
| 20:45 | 62.936 | 0.2028 | 524.165 | 0.203 | 843137.31 |
| 21:00 | 62.935 | 0.2030 | 524.142 | 0.203 | 843156.65 |
| 21:15 | 62.934 | 0.2022 | 524.112 | 0.202 | 843196.68 |
| 21:30 | 62.932 | 0.2026 | 524.147 | 0.203 | 843114.26 |
| 21:45 | 62.931 | 0.2029 | 524.145 | 0.203 | 843100.39 |
| 22:00 | 62.929 | 0.2029 | 524.139 | 0.203 | 843089.14 |
| 22:15 | 62.929 | 0.2029 | 524.118 | 0.203 | 843117.02 |
| 22:30 | 62.928 | 0.2029 | 524.124 | 0.203 | 843094.42 |
| 22:45 | 62.928 | 0.2029 | 524.132 | 0.203 | 843081.03 |
| 23:00 | 62.928 | 0.2025 | 524.132 | 0.203 | 843079.54 |
| 23:15 | 62.926 | 0.2027 | 524.125 | 0.203 | 843069.20 |
| 23:30 | 62.925 | 0.2026 | 524.119 | 0.203 | 843058.97 |
| 23:45 | 62.923 | 0.2028 | 524.129 | 0.203 | 843025.94 |

ATTACHMENT 3.3M

INDIAN POINT 2 1987

FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST

ABSOLUTE TEST METHOD, MASS POINT ANALYSIS TEST RESULTS

| Time (hh:mm) | Mass (LbM) | Leakage (PCT./DAY) | Confidence (PCT./DAY) | UCL (PCT./DAY) |
|---|---|---|---|---|
| 19:45 | 843217.28 | 0.000000 | 0.000000 | 0.000000 |
| 20:00 | 843202.90 | 0.000000 | 0.000000 | 0.000000 |
| 20:15 | 843187.69 | 0.168440 | 0.023287 | 0.191727 |
| 20:30 | 843218.50 | 0.013160 | 0.263801 | 0.276961 |
| 20:45 | 843137.31 | 0.164333 | 0.238930 | 0.403263 |
| 21:00 | 843156.65 | 0.152595 | 0.142355 | 0.294950 |
| 21:15 | 843196.68 | 0.083222 | 0.124765 | 0.207987 |
| 21:30 | 843114.26 | 0.125573 | 0.101489 | 0.227062 |
| 21:45 | 843100.39 | 0.147498 | 0.080312 | 0.227810 |
| 22:00 | 843089.14 | 0.157597 | 0.063810 | 0.221407 |
| 22:15 | 843117.02 | 0.141518 | 0.054107 | 0.195624 |
| 22:30 | 843094.42 | 0.136695 | 0.044797 | 0.181493 |
| 22:45 | 843081.03 | 0.134300 | 0.037596 | 0.171896 |
| 23:00 | 843079.54 | 0.129440 | 0.032341 | 0.161781 |
| 23:15 | 843069.20 | 0.125989 | 0.028052 | 0.154041 |
| 23:30 | 843058.97 | 0.123468 | 0.024532 | 0.148000 |
| 23:45 | 843025.94 | 0.126691 | 0.021780 | 0.148471 |

ATTACHMENT 3.3N

INDIAN POINT 2 1987

FROM 19:45 HOURS TO 23:45 HOURS ON 12/22/87

SUPERIMPOSED LEAKAGE VERIFICATION TEST

ABSOLUTE TEST METHOD, TOTAL TIME ANALYSIS TEST RESULTS

| Time (hh:mm) | Mass (LbM) | Meas.Leak. (PCT./DAY) | Calc.Leak. (PCT./DAY) | Confidence (PCT./DAY) | UCL (PCT./DAY) |
|---|---|---|---|---|---|
| 19:45 | 843217.28 | 0.000000 | 0.000000 | 0.000000 | 0.000000 |
| 20:00 | 843202.90 | 0.163726 | 0.000000 | 0.000000 | 0.000000 |
| 20:15 | 843187.69 | 0.168440 | 0.000000 | 0.000000 | 0.000000 |
| 20:30 | 843218.50 | -0.004617 | 0.025011 | 0.703074 | 0.728085 |
| 20:45 | 843137.31 | 0.227615 | 0.141582 | 0.614445 | 0.756027 |
| 21:00 | 843156.65 | 0.138055 | 0.140210 | 0.387291 | 0.527502 |
| 21:15 | 843196.68 | 0.039084 | 0.087612 | 0.314700 | 0.402312 |
| 21:30 | 843114.26 | 0.167546 | 0.117345 | 0.274322 | 0.391667 |
| 21:45 | 843100.39 | 0.166352 | 0.135586 | 0.240106 | 0.375692 |
| 22:00 | 843089.14 | 0.162092 | 0.146010 | 0.213329 | 0.359339 |
| 22:15 | 843117.02 | 0.114148 | 0.136563 | 0.194288 | 0.330851 |
| 22:30 | 843094.42 | 0.127164 | 0.133924 | 0.178125 | 0.312049 |
| 22:45 | 843081.03 | 0.129271 | 0.132597 | 0.165068 | 0.297665 |
| 23:00 | 843079.54 | 0.120626 | 0.129224 | 0.154485 | 0.283709 |
| 23:15 | 843069.20 | 0.120421 | 0.126583 | 0.145522 | 0.272106 |
| 23:30 | 843058.97 | 0.120153 | 0.124465 | 0.137834 | 0.262299 |
| 23:45 | 843025.94 | 0.136149 | 0.126444 | 0.131334 | 0.257777 |

# SECTION 4

## LOCAL LEAKAGE RATE TESTS (TYPES B AND C)

Type B and C testing was performed on the Containment Isolation Valves listed in Reference 5. Attachments 4A and 4B summarizes the results of the Local Leakage Rate Test's (LLRT's) obtained since the September 1984 Periodic Type A test. LLRT data is provided for surveillance testing performed in 1986 and 1987.

Description of Surveillance Test Procedures

The following test procedures were used to fulfill the requirements of Appendix J, 10CFR50 and the Technical Specifications:

1) PT-R27 Containment Isolation Valves Leakage Rate Determination (Gas or Nitrogen)

2) PT-R27A Containment Isolation Valves Leakage Rate Determination (RHR-Water)

3) PT-R27B Service Water Containment Isolation Valve Leak Rate Test (Module for each of the 5 Fan Cooler Units) (Water)

4) PT-R27C Containment Isolation Valves Leakage Rate Determination (Sealed by Weld Channel and Penetration Pressurization System or WCPPS) (Gas or Nitrogen)

5) PT-R26A Local IVSWS Test Type B & C (Water)

6) PT-R26B Local IVSWS Test Type B & C (Gas or Nitrogen)

7) PT-SA10 Containment Air Lock Test (Gas or Nitrogen)

Acceptance Criteria

1) The combined leakage rate for valves or penetrations leakage rated tested with gas or nitrogen shall be less than 0.60 La, which is equivalent to 4.56 SCFM.

2) The leakage rate into containment for isolation valves sealed with the service water system shall not exceed 0.36 GPM per fan cooler unit.

3) The leakage rate for the Isolation Valve Seal Water System (IVSWS) shall not exceed 14, 700 cc/hr (245 cc/min).

4) The allowable leakage from the Residual Heat Removal (RHR) System components located outside of containment shall not exceed two gallons per hour.

As-Left Conditions

The results of these test procedures were within the applicable acceptance criteria for leakage tests performed in 1986 and 1987. The individual totals for each test procedure can be obtained from the site test records. Attachment 4A contains the 1987 LLRT results, and Attachment 4B contains the 1986 LLRT results.

1987 As-Found Condition

Attachment 4C contains an analysis of the containment penetrations that were repaired during the 1987 IP2 Refueling Outage to assess the as-found containment leakage condition.

The data contained in this section are summarized below:

| Attachment No. | Title |
|---|---|
| 4A | 1987 Local Leakage Rate Test Data |
| 4B | 1986 Local Leakage Rate Test Data |
| 4C | 1987 Local Leakage Rate Test Summary Analysis |
| 4D | Air Lock Test Data (1-26-85 to 12-31-87) |
| 4E | Non-Outage On-Line Repairs (April 1987) |

The repair summaries for those valves repaired during the 1987 and 1986 Outages are contained on the last page of each Attachment. (i.e. page 15 for Attachment 4A, and page 13 for Attachment 4B).

## ATTACHMENT 4A

## 1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26A | 01 | Charging Line | 205, 226, 227 | 16.6 | 16.6 | |
| | 02 | Letdown | 201, 202 | 545.45 | 60.0 | 27568<br>27569 |
| | 03 | 21 RCP Seal Inj. | 250A, 4925 | 2.0 | 0.0 | |
| | 04 | 22 RCP Seal Inj. | 250B, 4926 | 3.66 | 0.0 | |
| | 05 | 23 RCP Seal Inj. | 250C, 4927 | 0.0 | 0.0 | |
| | 06 | 24 RCP Seal Inj. | 250D, 4928 | 14.5 | 0.0 | |
| | 07 | Seal Return | 222 | 6.58 | 6.58 | |
| | 08 | HRSS Pumps Return to VC Sump | 5132, 4399 | 0.0 | 0.0 | |
| | 09 | PZR Steam Space Sample | 956A, 956B | 0.0 | 0.0 | |
| | 10 | PZR Liquid Space Sample | 956C, 956D | 0.0 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26A | 11 | 23 HL Sample | 956E, 956F | 0.0 | 0.0 | |
| | 12 | Accumulator Sample | 956G, 956H | 0.0 | 1.0 | |
| | 13 | RCP Motor Brg Return | 784 | 0.33 | 0.33 | |
| | 14 | RCP CCW Supply | 797 | 1.33 | 1.33 | |
| | 15 | CCW to Excess Letdown Hx | 791, 798 | 0.0 | 0.0 | |
| | 16 | CCW from Excess Letdown Hx | 793, 796 | 0.0 | 0.0 | |
| | 17 | RCP Thermal Barrier Return | 625 | 0.66 | 0.66 | |
| | 18 | Cont. Sump Pump Disch. | 1723, 1728 | 22.0 | 22.0 | |
| | 19 | RCDT to Vent Header | 1786, 1787 | 180.0 | 0.5 | 34727 |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26A | 20 | RCDT to Gas Anal. | 1788, 1789 | 0.0 | 0.0 | |
| | 21 | RCDT Pump Disch. | 1702, 1705 | 180.0 | 0.5 | 36264 |
| | 22 | PRT to Gas Anal. | 548, 549 | 0.83 | 0.83 | |
| | 23 | Pri. Wtr to Cont. | 519, 552 | 0.33 | 0.33 | |
| | 24 | City Water | MW 17, MW 17-1 | 0.0 | 0.0 | |
| | 25 | Station Air to Cont. | SA 24-2, SA 24-3 | 0.0 | 0.0 | |
| | 26 | Aux. Stm to Cont. | UH 43 | 1.0 | 1.0 | |
| | 27 | Aux. Stm from Cont. | UH 44 | 1.0 | 1.0 | |
| | 28 | SIS Pump Test Line | 859A, 859C | 0.0 | 0.0 | |
| | 29 | 21 Spray Pump Disch. | 869A | 3.0 | 3.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26A | 30 | 22 Spray Pump Disch. | 869B | 0.43 | 0.43 | |
| | 31 | 21 SIS Pump Disch. | 850A | 40.0 | 1.50 | 27337 |
| | 32 | 23 SIS Pump Disch. | 850B | 31.66 | 34.0 | 31941 |
| | 33 | 22 SIS Pump Disch. to 21 SIS | 851A | 50.0 | 0.0 | 34647 |
| | 34 | 22 SIS Pump Disch. to 23 SIS | 851B | 1.33 | 0.0 | |
| | 35 | 21 SG Blowdown | 1214, 1214A | 5.33 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26A | 36 | 22 SG Blowdown | 1215, 1215A | 14.0 | 2.33 | |
| | 37 | 23 SG Blowdown | 1216, 1216A | 3.66 | 3.66 | |
| | 38 | 24 SG Blowdown | 1217, 1217A | 13.0 | 13.0 | |
| R26B | 01 | SIS Hi Hd Lo Hd Recirc. | 888A | 0.0 | 0.0 | |
| | 02 | SIS Hi Hd Lo Hd Recirc. | 888B | 0.0 | 0.0 | |
| | 03 | Recirc. Pump Sample | 990A, 990B | 0.0 | 0.0 | |
| | 04 | RHR Sample | 958, 959, 990D | 0.0 | 0.0 | |
| | 05 | RHR Pump Disch. | 744 | 0.0 | 0.0 | |
| | 06 | RHR Pump Suction | 732 | 49.3 | 49.3 | |
| | 07 | RHR Miniflow | 1870, 743 | 0.0 | 0.0 | |
| R27 | 01 | 21 Spray Pump | 867A | 295.9 | 295.9 | |
| | 01 | 21 Spray Pump | 878A | 0.0 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27 | 02 | 22 Spray Pump | 867B | 0.0 | 0.0 | |
| | 03 | PRT $N_2$ Supply | 518 | 167.1 | 167.1 | |
| | 04 | PRT $N_2$ Supply | 3418, 3419,4136 | 0.0 | 0.0 | |
| | 05 | RCDT $N_2$ Supply | 3416, 3417,1616 | 286.0 | 286.0 | |
| | 06 | Cont. Pressure | 1814A | 0.0 | 0.0 | |
| | 06 | Cont. Pressure | PT 948A, 949A | 0.0 | 0.0 | |
| | 07 | Cont. Pressure | 1814B | 0.0 | 0.0 | |
| | 07 | Cont. Pressure | PT 948B, 949B | 0.0 | 0.0 | |
| | 08 | Cont. Pressure | 1814C | 0.0 | 0.0 | |
| | 08 | Cont. Pressure | PT 948C, 949C | 0.0 | 0.0 | |
| | 09 | Dead Weight Tester | 580A | 4.99 | 4.99 | |
| | 09 | Dead Weight Tester | 580B | 4.99 | 4.99 | |
| | 10 | $O_2$ Supply to Cont. | 1V 2A, 1V 2B | 0.0 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27 | 10 | $O_2$ Supply to Cont | 1V 1A, 1V 1B | 0.0 | 0.0 | |
| | 11 | 21 $H_2$ Recomb. $H_2$ Supply | 1V 3A | 0.0 | 0.0 | |
| | 11 | 21 $H_2$ Recomb. $H_2$ Supply | 3420 | 0.0 | 0.0 | |
| | 12 | 21 $H_2$ Recomb. $H_2$ Supply | 1V 5A | 0.0 | 0.0 | |
| | 12 | 21 $H_2$ Recomb. $H_2$ Supply | 3421 | 0.0 | 0.0 | |
| | 13 | 22 $H_2$ Recomb. $H_2$ Supply | 1V 3B | 0.0 | 0.0 | |
| | 13 | 22 $H_2$ Recomb. $H_2$ Supply | 3422 | 0.0 | 0.0 | |
| | 14 | 22 $H_2$ Recomb. $H_2$ Supply | 1V 5B | 0.0 | 0.0 | |
| | 14 | 22 $H_2$ Recomb. $H_2$ Supply | 3423 | 0.0 | 0.0 | |
| | 15 | PACASS | 5018 | 0.0 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27 | 15 | PACASS | 5019 | 29.24 | 29.24 | |
| | 16 | PACASS | 5021 | 0.0 | 0.0 | |
| | 16 | PACASS | 5020 | 137.62 | 137.62 | |
| | 17 | PACASS | 5022, 5024 | 0.0 | 0.0 | |
| | 17 | PACASS | 5023 | 0.0 | 0.0 | |
| | 17 | PACASS | 5025 | 0.0 | 0.0 | |
| | 18 | Instru Air to Cont. | 1A 39 | 0.0 | 0.0 | |
| | 18 | Instru Air to Cont. | PCV1228 | 22.7 | 22.7 | |
| | 19 | $N_2$ to Accum. | 863 | 216.26 | 216.26 | |
| | 19 | $N_2$ to Accum. | 4312 | 167.10 | 167.10 | |
| | 20 | 80 Ft. Airlock | 85A | 0.0 | 0.0 | |
| | 20 | 80 Ft. Airlock | 85B | 0.0 | 0.0 | |
| | 21 | 95 Ft. Airlock | 95A | 0.0 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27 | 21 | 95 Ft. Airlock | 95B | 0.0 | 0.0 | |
| | 22 | Fuel Xfer Tube | Blind Flange | 0.0 | 0.0 | |
| | 23 | 21 S/G Level | 1PP 500 | 6.2 | 6.2 | |
| | 24 | 21 S/G Level | 1PP 501 | 16.8 | 16.8 | |
| | 25 | 22 S/G Level | 1PP 502 | 19.8 | 19.8 | |
| | 26 | 22 S/G Level | 1PP 503 | 18.3 | 18.3 | |
| | 27 | PZR Pressure | 1PP 504 | 7.4 | 7.4 | |
| | 28 | PZR Pressure | 1PP 505 | 6.7 | 6.7 | |
| | 29 | PZR Level | 1PP 506 | 3.2 | 3.2 | |
| | 30 | PZR Level | 1PP 507 | 3.2 | 3.2 | |
| R27A | 01 | RHR Pump Disch. Check | 741A | 22.3 | 22.3 | |
| | 02 | Cont. Sump Recirc. | 885B | 0.0 | 0.0 | |
| | 03 | Cont. Sump Recirc. | 885A | 0.0 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27B.1 | 01 | Service Wtr In-21FCU | SWN 41-1-A | 120.0 | 0.0 | |
| | 01 | Service Wtr Out-21FCU | SWN 41-1-A | 0.0 | 0.0 | |
| | 01 | Motor Cooler Out-21FCU | SWN 71-1-A | 645.0 | 0.0 | 34665 |
| | 01 | Service Wtr Relief & Drain-21FCU | SWN 42-1, 43-1 | 0.33 | 0.0 | |
| R27B.2 | 02 | Service Wtr In-22FCU | SWN 41-2-A | 2.166 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27B.2 | 02 | Service Wtr Out-22FCU | SWN 44-2-A | 475.0 | 0.0 | |
| | 02 | Motor Cooler Out-22FCU | SWN 71-2-A | 390.0 | 0.0 | |
| | 02 | Service Wtr Relief & Drain-22FCU | SWN 42-2, 43-2 | 3.6 | 0.0 | |
| R27B.3 | 03 | Service Wtr In-23FCU | SWN 41-3-A | 1200.0 | 5.0 | 34674 |
| | 03 | Service Wtr Out-23FCU | SWN 44-3-A | 20.67 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27B.3 | 03 | Motor Cooler Out-23FCU | SWN 71-3-A | 3.66 | 0.0 | |
| | 03 | Service Wtr Relief & Drain-23FCU | SWN 42-3, 43-3 | 29.27 | 0.0 | |
| R27B.4 | 04 | Service Wtr In-24FCU | SWN 41-4-A | 0.0 | 0.0 | |
| | 04 | Service Wtr Out-24FCU | SWN 44-4-A | 0.0 | 0.0 | |
| | 04 | Motor Cooler Out-24FCU | SWN 71-4-A | 0.0 | 0.0 | |
| | 04 | Service Wtr Relief & Drain-24FCU | SWN 42-4, 43-4 | 1.0 | 1.0 | |
| R27B.5 | 05 | Service Wtr In-25FCU | SWN 41-5-A | 8.3 | 8.3 | |
| | 05 | Service Wtr Out-25FCU | SWN 44-5-A | 0.0 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27B.5 | 05 | Motor Cooler Out-25FCU | SWN 71-5-A | 0.0 | 0.0 | |
| | 05 | Service Wtr Relief & Drain-25FCU | SWN 42-5, 43-5 | 7.0 | 7.0 | |
| R27C | 01 | Cont. Press Relief | PCV 1190, 1191 | 10454.0 | 983.5 | 34703 |
| | 02 | Cont. Press Relief | PCV 1191, 1192 | 10454.0 | 762.2 | |
| | 03 | Cont. Purge Supply | FCV 1170, 1171 | 5596.6 | 5596.6 | |
| | 04 | Cont. Purge Exhaust | FCV 1172, 1173 | 4803.6 | 4803.6 | |
| | 05 | SJAE Exhaust to Cont. | PCV 1129, 1230 | 591.8 | 954.5 | |
| | 06 | R-11, R-12 Supply | PCV 1234, 1235 | 23.2 | 23.2 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27C | 07 | R-11, R-12 Exhaust | PCV 1236, 1237 | 0.0 | 0.0 | |
| | 08 | PACV | E1,E2,E3,E5,EA1 | 4388.84 | 0.986 | 34718 |
| | 09 | 80 Ft. Airlock | 85C | 43.2 | 43.2 | |
| | 10 | 80 Ft. Airlock | 85D | 1136.585 | 54.2 | 34822 |
| | 11 | 95 Ft. Airlock | 95C | 0.0 | 0.0 | |
| | 12 | 95 Ft. Airlock | 95D | 0.0 | 0.0 | |

ATTACHMENT 4A (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

1987 REFUELING OUTAGE

| Work Order | Valve | Problem/Repair |
|---|---|---|
| 27337 | 850A | Double disc gate valve, spring between seats reversed |
| 27568 | 201 | Body to bonnet leak and packing leak |
| 27569 | 202 | Body to bonnet leak and packing leak |
| 31941 | 850B | Double disc gate valve, spring between seats reversed |
| 34647 | 851A | Double disc gate valve, spring between seats reversed |
| 34665 | 71-1-A | Seat leakage on Con Val valve repaired |
| 34674 | 41-3-A | Seat leakage, lapped seats, installed new bearings |
| 34703 | 1191 | Excessive seat leakage, cleaned T-ring and installed worm gear |
| 34718 | E5 | Saunders valve, replaced broken diaphragm |
| 34727 | 1786 | Saunders valve, replaced diaphragm |
| 34822 | 85D | Jamesbury ball valve with excessive seat leakage, seats replaced, valve rebuilt |
| 36264 | 1705 | Valve would not stroke, adjusted valve's air operator |

## ATTACHMENT 4B

## 1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26A | 01 | Charging Line | 205, 226, 227 | 22.3 | 22.3 | |
| | 02 | Letdown | 201, 202 | 0.0 | 0.0 | |
| | 03 | 21 RCP Seal Inj. | 250A, 4925 | 16.7 | 12.3 | 25061 |
| | 04 | 22 RCP Seal Inj. | 250B, 4926 | 20.0 | 20.0 | |
| | 05 | 23 RCP Seal Inj. | 250C, 4927 | 16.6 | 16.6 | |
| | 06 | 24 RCP Seal Inj. | 250D, 4928 | 1.3 | 1.3 | |
| | 07 | Seal Return | 222 | 0.0 | 11.3 | |
| | 08 | HRSS Pumps Return to VC Sump | 5132, 4399 | 1.16 | 1.16 | |
| | 09 | PZR Steam Space Sample | 956A, 956B | 0.6 | 0.6 | |
| | 10 | PZR Liquid Space Sample | 956C, 956D | 0.0 | 0.0 | |
| | 11 | 23 HL Sample | 956E, 956F | 0.23 | 0.23 | |
| | 12 | Accumulator Sample | 956G, 956H | 10.0 | 10.0 | |
| | 13 | RCP Motor Bearing Return | 784 | 5.3 | 1.0 | 22629 |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26A | 14 | RCP CCW Supply | 797 | 0.0 | 0.0 | |
| | 15 | CCW to Excess Letdown Hx | 791, 798 | 0.0 | 0.0 | |
| | 16 | CCW from Excess Letdown Hx | 793, 796 | 1.3 | 1.3 | |
| | 17 | RCP Thermal Barrier Return | 625 | 5.3 | 5.3 | |
| | 18 | Cont. Sump Pump Discharge | 1723, 1728 | 0.0 | 0.0 | |
| | 19 | RCDT to Vent Header | 1786, 1787 | 0.5 | 0.5 | |
| | 20 | RCDT to Gas Anal. | 1788, 1789 | 0.0 | 0.0 | |
| | 21 | RCDT Pump Disch. | 1702, 1705 | 0.0 | 0.0 | |
| | 22 | PRT to Gas Anal. | 548, 549 | 0.0 | 0.0 | |
| | 23 | Pri. Wtr. to Cont. | 519, 552 | 0.0 | 10.56 | |
| | 24 | City Water | MW17, MW17-1 | 0.0 | 0.0 | |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26A | 25 | Station Air to Containment | SA 24-2, SA 24-3 | 0.0 | 0.0 | |
| | 26 | Aux. Steam to Containment | UH 43 | 5.83 | 5.83 | |
| | 27 | Aux. Steam from Containment | UH 44 | 0.0 | 0.0 | |
| | 28 | SIS Pump Test Line | 859A, 859C | 0.0 | 0.0 | |
| | 29 | 21 Spray Pump Discharge | 869A | 0.5 | 0.5 | |
| | 30 | 22 Spray Pump Discharge | 869B | 1.67 | 1.67 | |
| | 31 | 21 SIS Pump Discharge | 850A | 29.5 | 0.0 | 27470 |
| | 32 | 23 SIS Pump Discharge | 850B | 32.3 | 29.33 | 12306 |
| | 33 | 22 SIS Pump Disch. to 21 SIS | 851A | 1.3 | 0.0 | 22672 |
| | 34 | 22 SIS Pump Disch. to 23 SIS | 851B | 2.0 | 0.0 | 22673 |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26A | 35 | 21 SG Blowdown | 1214, 1214A | 4.7 | 4.7 | |
| | 36 | 22 SG Blowdown | 1215, 1215A | 5.8 | 5.8 | |
| | 37 | 23 SG Blowdown | 1216, 1216A | 3.3 | 3.3 | |
| | 38 | 24 SG Blowdown | 1217, 1217A | 3.5 | 3.5 | |
| R26B | 01 | SIS Hi Hd Lo Hd Recirc. | 888A | 338.1 | 0.0 | 25378 |
| | 02 | SIS Hi Hd Lo Hd Recirc. | 888B | 196.0 | 452.0 | 25378 |
| | 03 | Recirc Pump Sample | 990A, 990B | 0.0 | 0.0 | |
| | 04 | RHR Sample | 958, 959, 990D | 98.0 | 98.0 | |
| | 05 | RHR Pump Disch. | 744 | 0.0 | 0.0 | |
| | 06 | RHR Pump Suction | 732 | 392.0 | 392.0 | |
| | 07 | RHR Miniflow | 1870, 743 | 0.0 | 0.0 | |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27 | 01 | 21 Spray Pump | 867A | 0.0 | 0.0 | |
| | 01 | 21 Spray Pump | 878A | 0.0 | 0.0 | |
| | 02 | 22 Spray Pump | 867B | 0.0 | 0.0 | |
| | 03 | PRT $N_2$ Supply | 518 | 0.0 | 0.0 | |
| | 04 | PRT $N_2$ Supply | 3418,3419,4136 | 28.2 | 28.2 | |
| | 05 | RCDT $N_2$ Supply | 3416,3417,1616 | 240.1 | 240.1 | |
| | 06 | Cont. Pressure | 1814A | 0.0 | 0.0 | |
| | 06 | Cont. Pressure | PT 948A, 949A | 0.0 | 0.0 | |
| | 07 | Cont. Pressure | 1814B | 0.0 | 0.0 | |
| | 07 | Cont. Pressure | PT 948B, 949B | 0.0 | 0.0 | |
| | 08 | Cont. Pressure | 1814C | 0.0 | 0.0 | |
| | 08 | Cont. Pressure | PT 948C, 949C | 0.0 | 0.0 | |
| | 09 | Dead Weight Tester | 580A | 0.0 | 0.0 | |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27 | 09 | Dead Weight Tester | 580B | 0.0 | 0.0 | |
| | 10 | $O_2$ Supply to Cont. | 1V 2A, 1V 2B | 19.6 | 19.6 | |
| | 10 | $O_2$ Supply to Cont. | 1V 1A, 1V 1B | 129.4 | 129.4 | |
| | 11 | 21 $H_2$ Recomb. $H_2$ Supply | 1V 3A | 22.1 | 22.1 | |
| | 11 | 21 $H_2$ Recomb. $H_2$ Supply | 3420 | 4.9 | 4.9 | |
| | 12 | 21 $H_2$ Recomb. $H_2$ Supply | 1V 5A | 0.0 | 0.0 | |
| | 12 | 21 $H_2$ Recomb. $H_2$ Supply | 3421 | 0.0 | 0.0 | |
| | 13 | 22 $H_2$ Recomb. $H_2$ Supply | 1V 3B | 6.1 | 6.1 | |
| | 13 | 22 $H_2$ Recomb. $H_2$ Supply | 3422 | 12.3 | 12.3 | |
| | 14 | 22 $H_2$ Recomb. $H_2$ Supply | 1V 5B | 19.6 | 19.6 | |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27 | 14 | 22 $H_2$ Recomb. $H_2$ Supply | 3432 | 0.0 | 0.0 | |
| | 15 | PACASS | 5018 | 0.0 | 0.0 | |
| | 15 | PACASS | 5019 | 29.4 | 29.4 | |
| | 16 | PACASS | 5021 | 0.0 | 0.0 | |
| | 16 | PACASS | 5020 | 53.9 | 53.9 | |
| | 17 | PACASS | 5022,5024 | 0.0 | 0.0 | |
| | 17 | PACASS | 5023 | 0.0 | 0.0 | |
| | 17 | PACASS | 5025 | 0.0 | 0.0 | |
| | 18 | Instru. Air to Cont. | 1A 39 | 0.0 | 0.0 | |
| | 18 | Instru. Air to Cont. | PCV 1228 | 88.2 | 88.2 | |
| | 19 | $N_2$ to Accum. | 863 | 52.6 | 52.6 | |
| | 19 | $N_2$ to Accum. | 4312 | 103.8 | 103.8 | |
| | 20 | 80 Ft. Airlock | 85A | 0.0 | 0.0 | |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27 | 20 | 80 Ft. Airlock | 85B | 0.0 | 0.0 | |
| | 21 | 95 Ft. Airlock | 95A | 0.0 | 0.0 | |
| | 21 | 95 Ft. Airlock | 95B | 176.4 | 176.4 | |
| | 22 | Fuel Xfer Tube | Blind Flange | 0.0 | 0.0 | |
| | 23 | 21 S/G Level | 1PP 500 | 0.0 | 0.0 | |
| | 24 | 21 S/G Level | 1PP 501 | 0.0 | 0.0 | |
| | 25 | 22 S/G Level | 1PP 502 | 33.6 | 33.6 | |
| | 26 | 22 S/G Level | 1PP 503 | 33.0 | 33.0 | |
| | 27 | PZR Pressure | 1PP 504 | 84.4 | 84.4 | |
| | 28 | PZR Pressure | 1PP 505 | 81.0 | 81.0 | |
| | 29 | PZR Level | 1PP 506 | 0.0 | 0.0 | |
| | 30 | PZR Level | 1PP 507 | 0.0 | 0.0 | |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27A | 01 | RHR Pump Disch. Check | 741A | 0.0 | 0.0 | |
| | 02 | Cont. Sump Recirc. | 885B | 0.0 | 0.0 | |
| | 02 | Cont. Sump Recirc. | 885A | 0.0 | 0.0 | |
| R27B.1 | 01 | Service Water In-21 FCU | SWN 41-1-A | 40.0 | 40.0 | |
| | 01 | Service Water Out-21FCU | SWN 44-1-A | 0.0 | 0.0 | |
| | 01 | Motor Cooler Out-21FCU | SWN 71-1-A | 0.0 | 0.0 | |
| | 01 | Service Wtr Relief & Drain-21FCU | SWN 42-1, 43-1 | 54.0 | 54.0 | |
| R27B.2 | 02 | Service Water In-21FCU | SWN 41-2-A | 0.0 | 0.0 | |
| | 02 | Service Water Out-21FCU | SWN 44-2-A | 0.0 | 0.0 | |
| | 02 | Motor Cooler Out-22FCU | SWN 71-2-A | 0.0 | 0.0 | |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27B.2 | 02 | Service Wtr Relief & Drain-22FCU | SWN 42-2, 43-2 | 7.6 | 7.6 | |
| R27B.3 | 03 | Service Wtr In-23FCU | SWN 41-3-A | 0.0 | 0.0 | |
| | 03 | Service Wtr Out-23FCU | SWN 44-3-A | 0.0 | 0.0 | |
| | 03 | Motor Cooler Out-23FCU | SWN 71-3-A | 0.0 | 0.0 | |
| | 03 | Service Wtr Relief & Drain-23FCU | SWN 42-3, 43-3 | 1.166 | 1.166 | |
| R27B.4 | 04 | Service Wtr In-24FCU | SWN 41-4-A | 80.0 | 80.0 | |
| | 04 | Service Wtr Out-24FCU | SWN 44-4-A | 0.0 | 0.0 | |
| | 04 | Motor Cooler Out-24FCU | SWN 71-4-A | 300.0 | 0.0 | 25327 |
| | 04 | Service Wtr & Drain-24FCU | SWN 42-4, 43-4 | 3.3 | 3.3 | |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27B.5 | 05 | Service Wtr In-25FCU | SWN 41-5-A | 15.0 | 15.0 | |
| | 05 | Service Wtr Out-25FCU | SWN 44-5-A | 0.0 | 0.0 | |
| | 05 | Motor Cooler Out-25FCU | SWN 71-5-A | 560.0 | 0.0 | 25414 |
| | 05 | Service Wtr Relief & Drain-25FCU | SWN 42-5, 43-5 | 3.0 | 3.0 | |
| R27C | 01 | Cont. Press Relief | PCV 1190, 1191 | 0.0 | 0.0 | |
| | 02 | Cont. Press Relief | PCV 1191, 1192 | 0.0 | 2450.0 | |
| | 03 | Cont. Purge Supply | FCV 1170, 1171 | 1067.0 | 1067.0 | |
| | 04 | Cont. Purge Exhaust | FCV 1172, 1173 | 3880.0 | 3880.0 | |
| | 05 | SJAE Exhaust to Cont. | PCV 1229, 1230 | 1164.0 | 1164.0 | |
| | 06 | R-11, R-12 Supply | PCV 1234, 1235 | 16.9 | 16.9 | |

ATTACHMENT 4B (Cont.)

1986 LOCAL LEAKAGE RATE TEST DATA

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R27C | 07 | R-11, R-12 Exhaust | PCV 1236, 1237 | 0.0 | 0.0 | |
| | 08 | RACV | E1,E2,E3,E5,EA1 | 0.0 | 0.0 | |
| | 09 | 80 Ft. Airlock | 85C | 17280.5 | 0.0 | 20828 |
| | 10 | 80 Ft. Airlock | 85D | 37609.3 | 0.0 | 20828 |
| | 11 | 95 Ft. Airlock | 95C | 0.0 | 0.0 | |
| | 12 | 95 Ft. Airlock | 95D | 0.0 | 0.0 | |

ATTACHMENT 4B (Cont.)

1987 LOCAL LEAKAGE RATE TEST DATA

1986 REFUELING OUTAGE

| Work Order | Valve | Problem/Repair |
|---|---|---|
| 12306 | 850B | Valve difficult to operate, replaced MOV |
| 22672 | 851A | Refueling outage PM |
| 22673 | 851B | Refueling outage PM |
| 22629 | 784 | Refueling outage PM |
| 25061 | 4925 | Valve would not stroke, replaced MOV and valve bonnet assembly |
| 25327 | 71-4-A | Replaced stem and disc assembly |
| 25378 | 888A&B | Replaced torque switch assembly for environmental qualification |
| 25414 | 71-5-A | Replaced valve stem, repacked valve |
| 27470 | 850A | Valve would not close, replaced MOV |

# ATTACHMENT 4C
# 1987 LOCAL LEAKAGE RATE TEST SUMMARY ANALYSIS

In order to assess the as-found containment condition for the 1987 IP2 Refueling Outage, the pre-repair LLRT results, the repair performed, and the post-repair and LLRT results were reviewed. The net leakage contribution for each penetration was determined using the following criteria:

1. A leakage equivalent to the repair improvement achieved for each penetration is calculated.

2. The leakage equivalent is the difference between the pre-repair and the post-repair LLRT results.

3. If a repair was not performed, the penetration is not included in the summary analysis.

4. The leakage equivalent assessed to a penetration may be reduced due to the safety-related service of the system. Justification for this reduction will be provided in the analysis.

5. The net equivalent leakage is to be determined using a minimum pathway analysis. For example, a minimum pathway analysis for a combination test would conservatively assign one half of the repair improvement to both barriers, provided both valves were repaired.

6. When the summation of the net leakage equivalent and the leakage measured during a successful Type A test is greater than La, the penetration(s) with excessive leakage(s) shall be analyzed under a failure analysis program.

## ATTACHMENT 4C (Cont.)
## 1987 LOCAL LEAKAGE RATE TEST SUMMARY ANALYSIS

| Test Procedure | Data Sheet | Repair Improvement | Minimum Path | Net | Remarks |
|---|---|---|---|---|---|
| R26A | 02 | 485.45 | 242.725 | 0.0 | See Note 2 |
| R26A | 03 | 2.0 | 1.0 | 0.0 | See Note 2 |
| R26A | 04 | 3.66 | 1.83 | 0.0 | See Note 2 |
| R26A | 06 | 14.5 | 7.25 | 0.0 | See Note 2 |
| R26A | 19 | 179.5 | 0.0 | 0.0 | See Notes 2,3 |
| R26A | 21 | 179.5 | 0.0 | 0.0 | See Notes 2,3 |
| R26A | 31 | 38.5 | 19.25 | 0.0 | See Note 2 |
| R26A | 33 | 50.0 | 25.0 | 0.0 | See Note 2 |
| R26A | 34 | 1.33 | 0.665 | 0.0 | See Note 2 |
| R26A | 35 | 5.33 | 2.665 | 0.0 | See Note 2 |
| R26A | 36 | 11.67 | 5.835 | 0.0 | See Note 2 |
| R27B.1 | 01 | 120.0 | - | 0.0 | See Note 4 |
| R27B.1 | 01 | 645.0 | - | 0.0 | See Note 4 |
| R27B.1 | 01 | 0.33 | - | 0.0 | See Note 4 |
| R27B.2 | 02 | 2.166 | - | 0.0 | See Note 4 |
| R27B.2 | 02 | 475.0 | - | 0.0 | See Note 4 |
| R27B.2 | 02 | 390.0 | - | 0.0 | See Note 4 |
| R27B.2 | 02 | 3.6 | - | 0.0 | See Note 4 |
| R27B.3 | 03 | 1195.0 | - | 0.0 | See Note 4 |
| R27B.3 | 03 | 20.67 | - | 0.0 | See Note 4 |
| R27B.3 | 03 | 3.66 | - | 0.0 | See Note 4 |
| R27B.3 | 03 | 29.27 | - | 0.0 | See Note 4 |
| R27C | 01/02 | 1788 | 894 | 894 | See Note 5 |
| R27C | 08 | 4387.854 | - | 0.0 | See Note 3 |
| R27C | 10 | 1082.385 | - | 0.0 | See Note 3 |

# ATTACHMENT 4C (Cont.)
# 1987 LOCAL LEAKAGE RATE TEST SUMMARY ANALYSIS

Notes:

1. The resulting net equivalent leakage of 894 sccm or approximately 0.000415 percent/day indicates that IP2's maximum allowable leakage rate of 0.1 percent/day was not exceeded.

2. The leakage equivalent for these penetrations is not included in the net because these valves are water sealed by the IVSWS. See IP2 FSAR Section 6.5 for the IVSWS description.

3. Only one valve in each of the following test procedure/data sheets were repaired:

| Test Procedure | Data Sheet | Valve Repaired |
|---|---|---|
| R26A | 19 | 1786 |
| R26A | 21 | 1705 |
| R27C | 8 | E5 |
| R27C | 10 | 85D* |

*85C is a duplicate valve

4. These are service water isolation valves for the fan cooler units. Five fan cooler units inside containment are supplied from the service water system. These units are redundant to the containment spray system and serve to remove heat from containment under accident conditions. Each fan cooler unit has its own service water supply and return penetrations. Supply and return lines are headered together outside of containment. See IP2 FSAR Section 9.6.1 for a description of the Service Water System. The leakage equivalent for these penetrations is not included in the net since the fan cooler unit coils and piping are the containment boundary during the DBA LOCA. During the type A test, these valves are closed to isolate service water to containment. The system is also vented between the valves and outside containment.

5. The valve arrangement consists of three valves in series (PCV-1190, PCV-1191, and PCV-1192) with test connections between each valve. Five tests were performed to determine the pre-repair and post-repair leakage rates. These tests are discussed below:

   a) The first test involved the 1190/1191 pair and resulted in a 10,454 sccm result.
   b) The second test involved the 1191/1192 pair with a similar 10,454 sccm result.
   c) The third test involved the outer valves 1190 and 1192 with a 2550 sccm result.
   d) The post-repair LLRT results for 1190/1192 were 762.2 sccm.

The repair improvement is calculated by using the pre-repair 1190/1192 LLRT result of 2550 sccm minus the post-repair 1191/1192 LLRT result of 762 sccm. This difference of 1788 sccm is divided in half to determine the net of 894 sccm.

## ATTACHMENT 4D

## AIRLOCK TEST DATA

| Test Procedure | Name | Date | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|
| SA10 | Air Lock | 12-31-87 | 0.26 | 0.26 | |
| | | 03-09-87 | 0.765 | 0.765 | |
| | | 10-13-86 | 0.986 | 0.986 | |
| | | 1986 RFO | 1.48 | 1.48 | |
| | | 12-14-85 | 1.46 | 1.46 | |
| | | 07-21-85 | 2.20 | 2.20 | |
| | | 01-26-85 | 2.48 | 2.48 | |

ATTACHMENT 4E

NON-OUTAGE ON LINE REPAIRS (APRIL 1987)

| Test Procedure | Data Sheet | Name | Valve No(s) | Pre-Repair Leakage Rate (cc/min) | Post-Repair Leakage Rate (cc/min) | Repair/Notes |
|---|---|---|---|---|---|---|
| R26 | 32 | 23 SIS Pump Disch. | 850B | | 30 | Valve failed to stroke during quarterly ASME XI IWV Exercise Test. The motor operator was replaced. |

ENCLOSURE 1

ATTENDANCE LIST

MEETING TO DISCUSS RESULTS OF
MID-CYCLE INSPECTION OF
STEAM GENERATORS AT INDIAN POINT UNIT NO. 2

May 21, 1990

| NAME | POSITION | ORGANIZATION |
|---|---|---|
| Donald S. Brinkman | Senior Project Manager | NRC/NRR/PDI-1 |
| Robert A. Capra | Director, PDI-1 | NRC/NRR/PDI-1 |
| William T. Russell | Associate Director | NRC/NRR/ADT |
| James E. Richardson | Director, Div. of Eng. Tech. | NRC/NRR/DET |
| Michael L. Miele | General Mgr, Technical Services | Con Ed |
| Charles W. Jackson | Mgr, Nuclear Safety & Licensing | Con Ed |
| Curt Cowgill | Chief, RP Sect 1A | NRC/Region I |
| Charles Durkin | Vice President, Engineering | Con Ed |
| Stephen B. Bram | Vice President, Nuclear Power | Con Ed |
| Jack Strosnider | Chief, Materials & Processes Sec | NRC/Region I |
| Wayne Hodges | Director, DRS | NRC/Region I |
| Barry J. Elliot | Senior Materials Engineer | NRC/NRR/DET/EMCB |
| Jacque Durr | Chief, Engineering Branch | NRC/Region I |
| C. Y. Cheng | Chief, EMCB | NRC/DET/EMCB |
| Robert Hermann | Chief, Metallurgy Section | NRC/DET/EMCB |
| Joe Muscara | Senior Met. Eng. | NRC/RES |
| Steven Varga | Division Director, Reactor Projects | NRC/NRR |
| Gil Millman | Section Chief, Engineer Standards | NRC/RES/DE |
| C. D. Sellers | Senior Met. Engineer | NRC/NRR/DET/EMCB |
| Jim Caldwell | Regional Coordinator | NRC/OEDO |
| Martin Hum | Materials Engineer | NRC/NRR/DET/EMCB |
| Joel Witt | Fellow Engineer | W/NATD/MMDT |
| Rich D. Rishel | Manager, Metallurgical & NDC Analysis | W/NATD |
| John McAvoy | Director, Nuclear Quality Assurance | Con Ed |
| George Wasilenko | QA Consultant | Con Ed |
| Ray Burns | Chemistry Engineer | Con Ed |
| David Hinshaw | S/G Maint. Project Manager | Con Ed |
| Peter Skulte | Senior Engineer Mechanical Engineering | Con Ed |
| Kamal Manoly | Technical Assistant | NRC/NRR/DET |
| Michael Franovich | General Engineer | NRC/NRR |
| Charles Hinson | Health Physicist | NRC/NRR/PRPB |
| A. R. Vaia | Manager, Steam Gen. Engr. Services | Westinghouse |
| Gutti Rao | Senior Engineer, Materials | Westinghouse |
| Richard Lambert | Chief Mechanical Engineer | Con Ed |
| Keith F. Matthews | Senior Project Engineer | Westinghouse |

| | | |
|---|---|---|
| Steven Swigart | Project Manager | Westinghouse |
| Robert R. Laubham | Senior Engineer, Nuclear Safety and Licensing | Westinghouse |
| Nancy Jones | Legal Assistant | Shaw, Pittman for Con Ed |
| | Project Staff | NRC/NRR/PDI-3 |
| Ron Williams | Manager, Steam Generator Tech & Eng | Westinghouse |
| John Wootter | Manager, Str Mech | WNSD |
| John Houtman | Fellow Engineer, Materials Technology | Westinghouse |
| Warren Bamford | Stress Analysis Engineer | Con Ed |
| Sam Sinha | Mechanical Engineer | Con Ed |
| M. Marina | Senior Engineer, Nuclear Safety | Westinghouse |
| Donald Lindgren | Senior Reactor Engineer | NRC/NRR |
| N. Prasad Kadambi | Acting Q.C. Manager | Con Ed |
| Serge Brozski | Prin. Eng., NS&L | Con Ed |
| John Ellwanger | | |

ENCLOSURE 2

# INDIAN POINT UNIT 2

# STEAM GENERATOR INSPECTION, REPAIR AND RESTORATION

## PRESENTATION TO THE NUCLEAR REGULATORY COMMISSION

MAY 21, 1990

CONSOLIDATED EDISON COMPANY OF NEW YORK

# INDIAN POINT UNIT 2
# STEAM GENERATOR INSPECTION, REPAIR AND RESTORATION

MAY 21, 1990

## AGENDA

1. INTRODUCTION
2. MID-CYCLE INSPECTION AND REPAIRS
3. BOAT SAMPLE(S) ANALYSIS AND ROOT CAUSE
4. INDUSTRY EXPERIENCE
5. STEAM GENERATOR INTEGRITY EVALUATIONS
   A) GIRTH WELD
   B) FEEDWATER NOZZLE
6. MITIGATING ACTIONS
7. OTHER ISSUES
8. FUTURE PLANS

## MEETING OBJECTIVE

DEMONSTRATE STEAM GENERATOR INTEGRITY FOR RETURN TO POWER AND CONTINUED OPERATION.

## BASIS FOR STEAM GENERATOR INTEGRITY

- o CAUSATIVE MECHANISMS ARE KNOWN AND PERMIT BOUNDING OF CAUSATIVE FACTORS AND RELATIVE SENSITIVITY BASED ON STEAM GENERATOR LOCATION
  - MECHANISM
    - o ENVIRONMENTALLY ASSISTED CRACKING (STRESS CORROSION CRACKING AND CORROSION FATIGUE)
  - CONTRIBUTING FACTORS
    - o SECONDARY SIDE CHEMISTRY
      - OXYGEN
      - OXIDIZING SPECIES (COPPER)
    - o APPLIED (OPERATING) STRESS
    - o RESIDUAL STRESS

## BASIS FOR STEAM GENERATOR INTEGRITY
(CONTINUED)

- ALL AREAS OF CONCERN HAVE BEEN INSPECTED, AND REPAIRED AS REQUIRED.

- MATERIAL SAMPLE TESTS SHOW NO SERVICE AGING OF BASIC MECHANICAL PROPERTIES.

- MITIGATING ACTIONS FOR AUXILIARY FEEDWATER OXYGEN CONTROL AND THE FEEDWATER CONTROL VALVE REDUCE THE POTENTIAL FOR CRACK INITIATION AND PROPAGATION.

- ALL REPAIRS HAVE BEEN PERFORMED IN ACCORDANCE WITH THE REQUIREMENTS OF ASME CODE AND CODE CASE N-432.

- EVAULATION OF STEAM GENERATOR INTEGRITY HAS SHOWN NO UNREVIEWED SAFETY QUESTIONS.

# STEAM GENERATOR INSPECTIONS

## FIVE MAJOR CATEGORIES

- GIRTH WELDS
- NOZZLES
- FEEDWATER PIPE
- BRACKETS
- OTHER AREAS

# STEAM GENERATOR GIRTH WELD INSPECTIONS

| | | |
|---|---|---|
| INSPECTION PLAN | - | 1/3 OF 2 S.G.'s<br>100% OF 2 S.G.'s + 1/3 2 ADD'L S.G's<br>100% OF ALL 4 S.G.'s |
| INSPECTION METHOD | - | M. T. |
| ADD'L. INFORMATION | - | BOAT SAMPLES TO SPAN CONDITIONS |
| REPAIR METHOD | - | GRIND OUT, MT CLEAR<br>REPAIR BY TEMPER BEAD WELDING IN SG 22. NO AREA $\geq$ .68" FROM ORIGINAL WALL |
| ACCEPTANCE NDE | - | MT, UT, RT OF WELDS + 10" ALL AROUND |

# Indian Point 2
# Steam Generators

## Girth Weld

| | SG21 | SG22 | SG23 | SG24 |
|---|---|---|---|---|
| 1990 # of Indications | 42 | 26 | 14 | 10 |
| Max. Depth* | 0.36" | 0.53" | 0.28" | 0.34" |
| Avg. Depth | 0.13" | 0.11" | 0.08" | 0.16" |

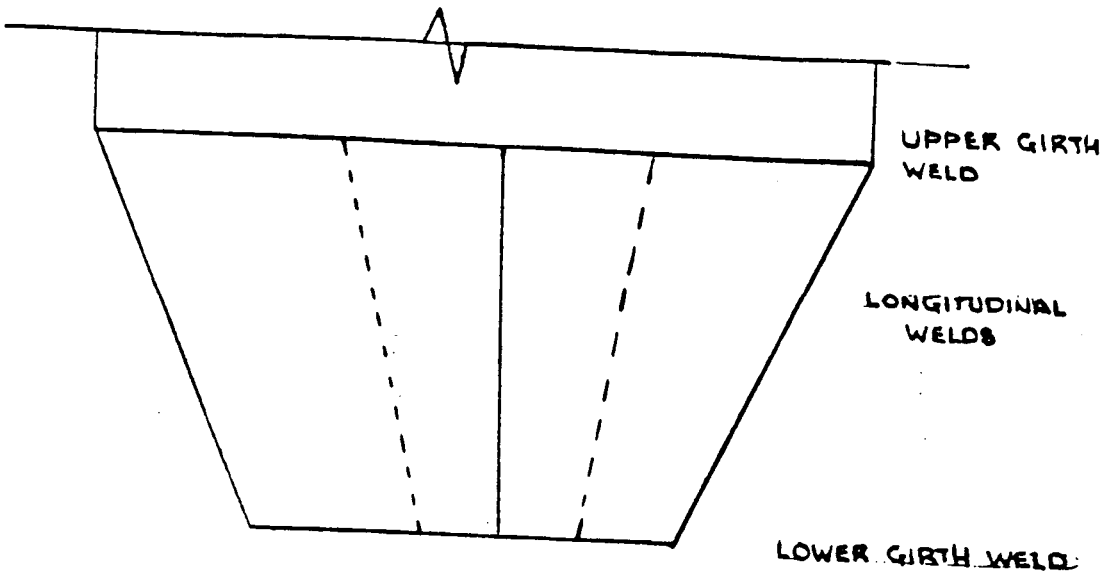
* Depth of Grindout

# ADDITIONAL GIRTH REGION INSPECTIONS

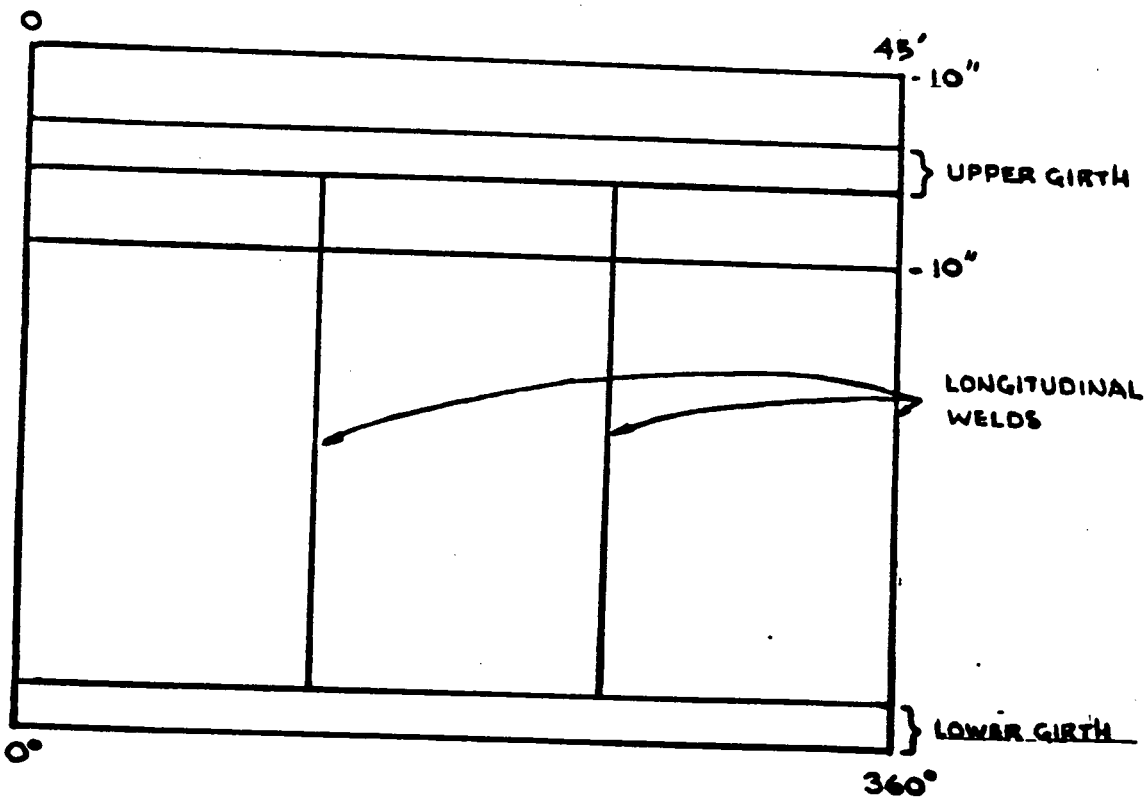
INSPECTION PLAN

- UT 10" BELOW GIRTH WELD ALL SG's 360°
- SAMPLE UT 1/3 OF ENTIRE TRANSITION CONE 2 SG's
  - INCLUDES 1/2 OF EACH ADJACENT PLATES
  - INCLUDES TOTAL LENGTH OF 1 OF 3 LONGITUDINAL WELDS
  - INCLUDES LOWER GIRTH WELD
  - INCLUDES WELDED INTERIOR WELDED ATTACHMENTS

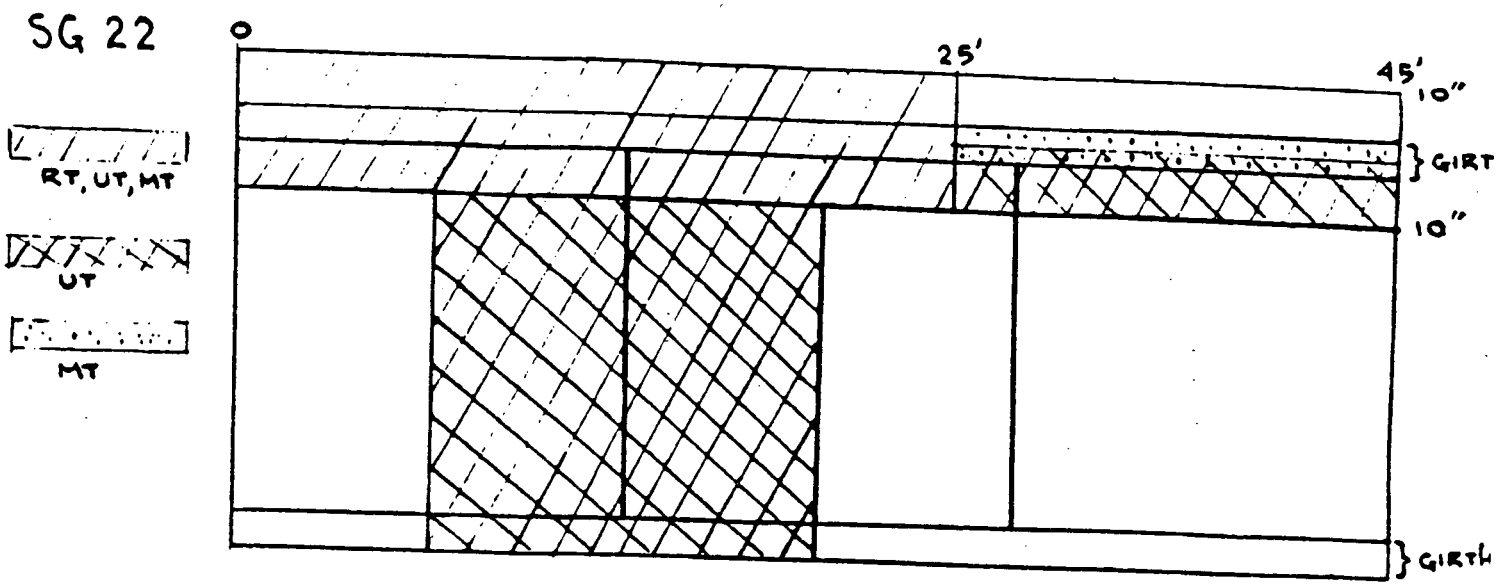
# STEAM GENERATOR TRANSITION CONES

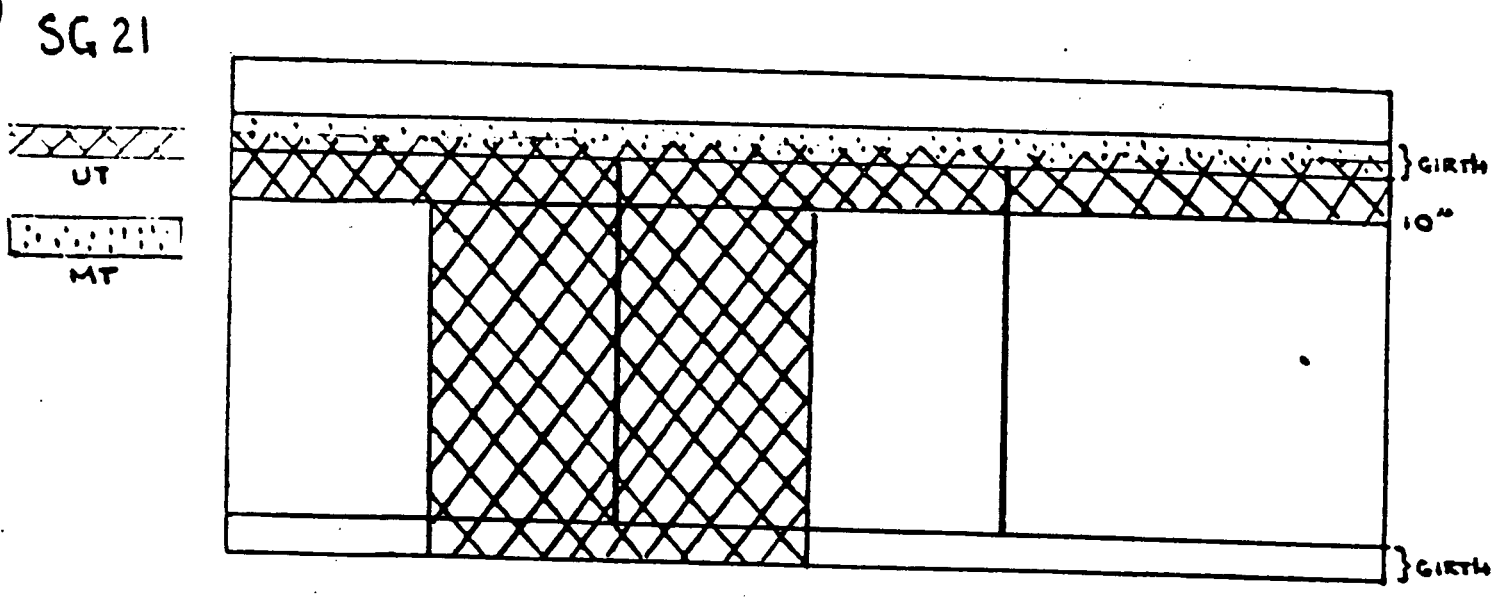


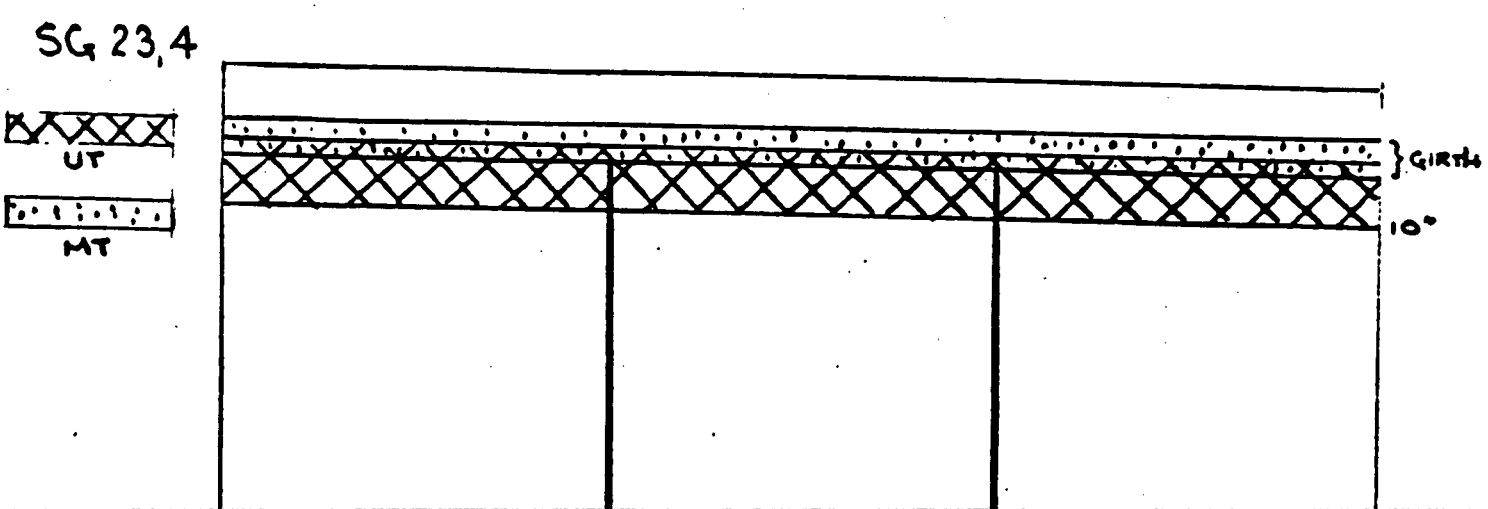

## UNFOLDED VIEW



# DIAGRAMATIC SUMMARY OF TRANSITION CONE INSPECTION AREAS



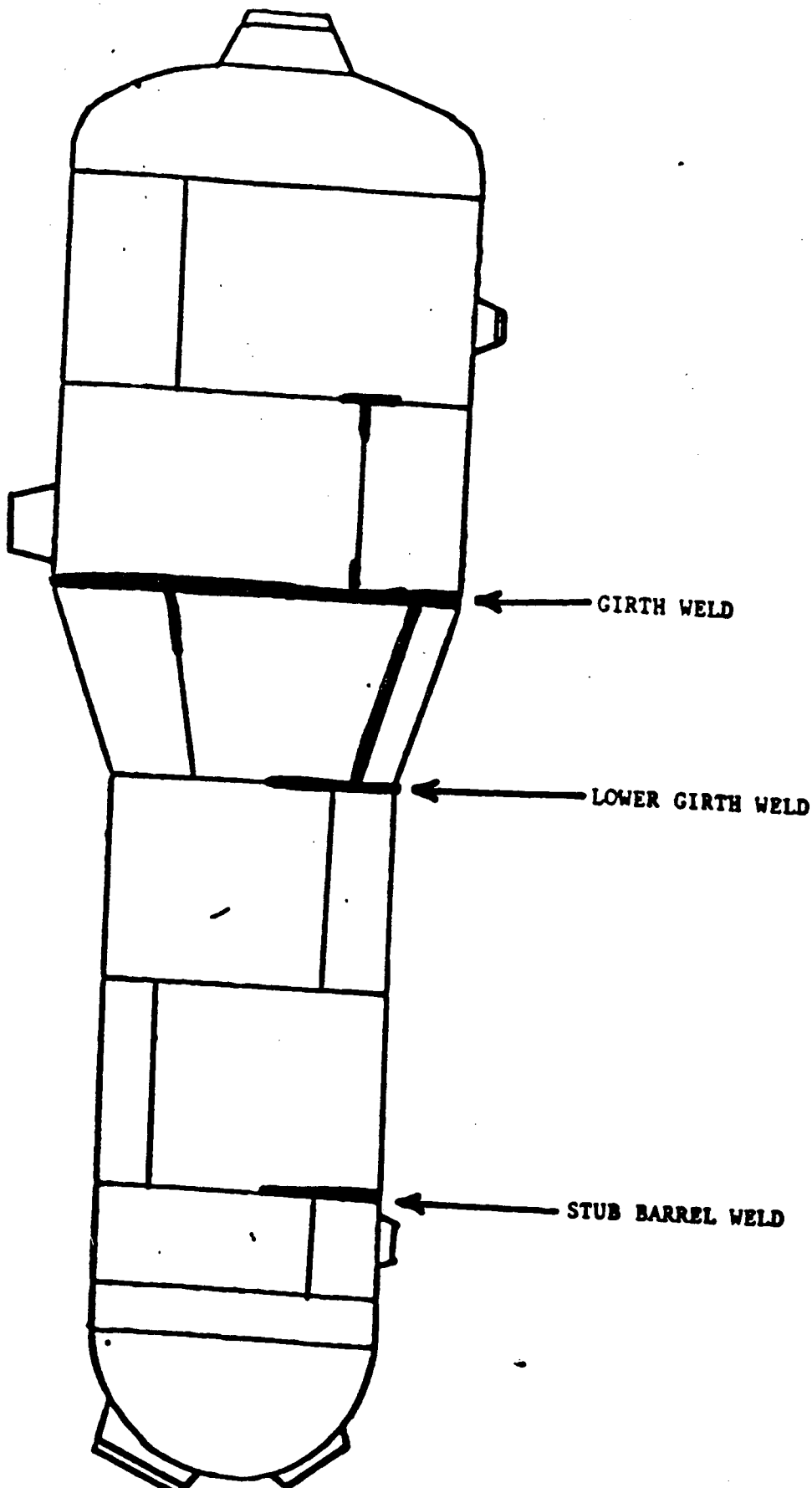



# ADDITIONAL GIRTH RELATED INSPECTIONS

| | |
|---|---|
| INSPECTION PLAN | - SAMPLE ADDITIONAL CIRCUMFFERENTIAL WELD |
| | - COMPARE TO PREVIOUS EXAM RESULTS |
| METHOD | - UT |
| RESULTS | - NO RELEVANT INDICATIONS SAME AS 1986 |

# STEAM GENERATOR SHELL WELDS



# NOZZLE EXAMINATION

| | |
|---|---|
| INSPECTION PLAN | 2 OF 4 NOZZLE FACES - |
| | ALL NOZZLE FACES |
| | ALL NOZZLE BORES REMOTELY |
| INSPECTION METHOD | P.T., M.T. FACES |
| | REMOTE V.T. NOZZLE BORE |
| EXPANDED INSPECTION | REMOVE ALL THERMAL SLEEVES |
| | EXAMINE ALL BORES |
| | EXAMINE ALL NOZZLE TO PIPE WELDS |
| INSPECTION METHODS | P.T., M.T., BORE, |
| | P.T., M.T., R.T., WELDS |
| ADD'L. INFORMATION | BOAT SAMPLE |

# NOZZLE EXAMINATION

(CONTINUED)

| | |
|---|---|
| REPAIR METHOD | GRIND OUT, M.T. CLEAR<br>REPAIR BY HALF BEAD - BORE<br>REPAIR BY GTAW - COUNTERBORE<br>REPLACE NOZZLE TO PIPE WELD<br>MACHINE TO ORIGINAL CONFIGURATION |
| ACCEPTANCE NDE | M.T., U.T., R.T., OF WELDS<br>PLUG 5" ALL AROUND<br>ESTABLISH NEW SECTION XI BASE - LINE U.T., R.T. |
| ADD'L INFORMATION | M.T. THERMAL SLEEVES O.D. & I.D. |

# INSPECTION RESULTS

## NOZZLE AREA

## GRINDING DEPTH, IN. MAX.

| SG | FACE AT BRACKET | KNUCKLE | BORE | PIPE WELD |
|---|---|---|---|---|
| 21 | 0.44 | 0.40 | 0.198 | 0.318 |
| 22 | 0.40 | 0.00 | 0.295 | 0.388 |
| 23 | 0.70 | 0.13 | 0.217 | 0.200 |
| 24 | 0.70 | * | 0.347 | 0.270 |

GRINDING BEGAN BEFORE BASELINE MEASUREMENTS

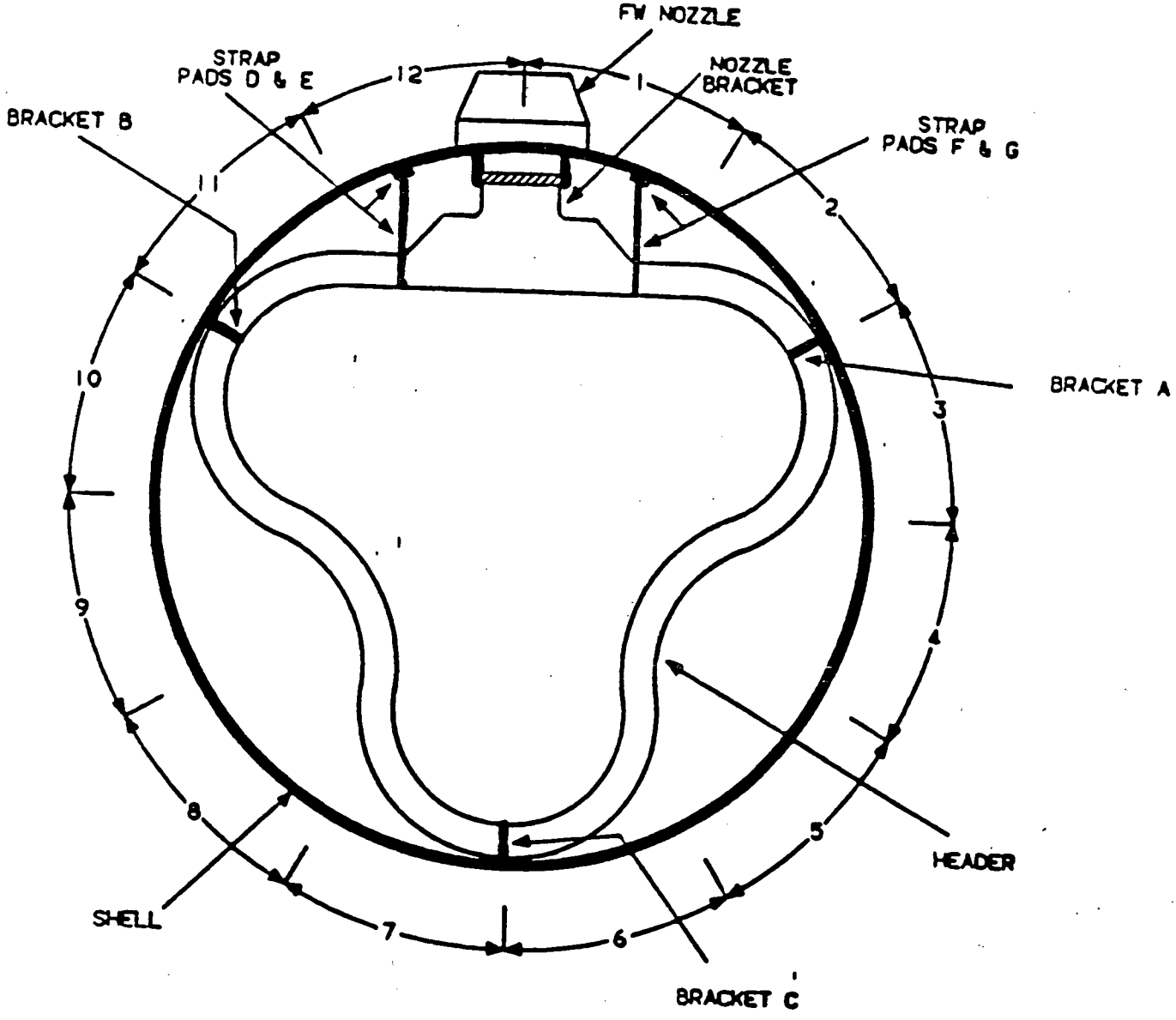
# FEEDWATER PIPE

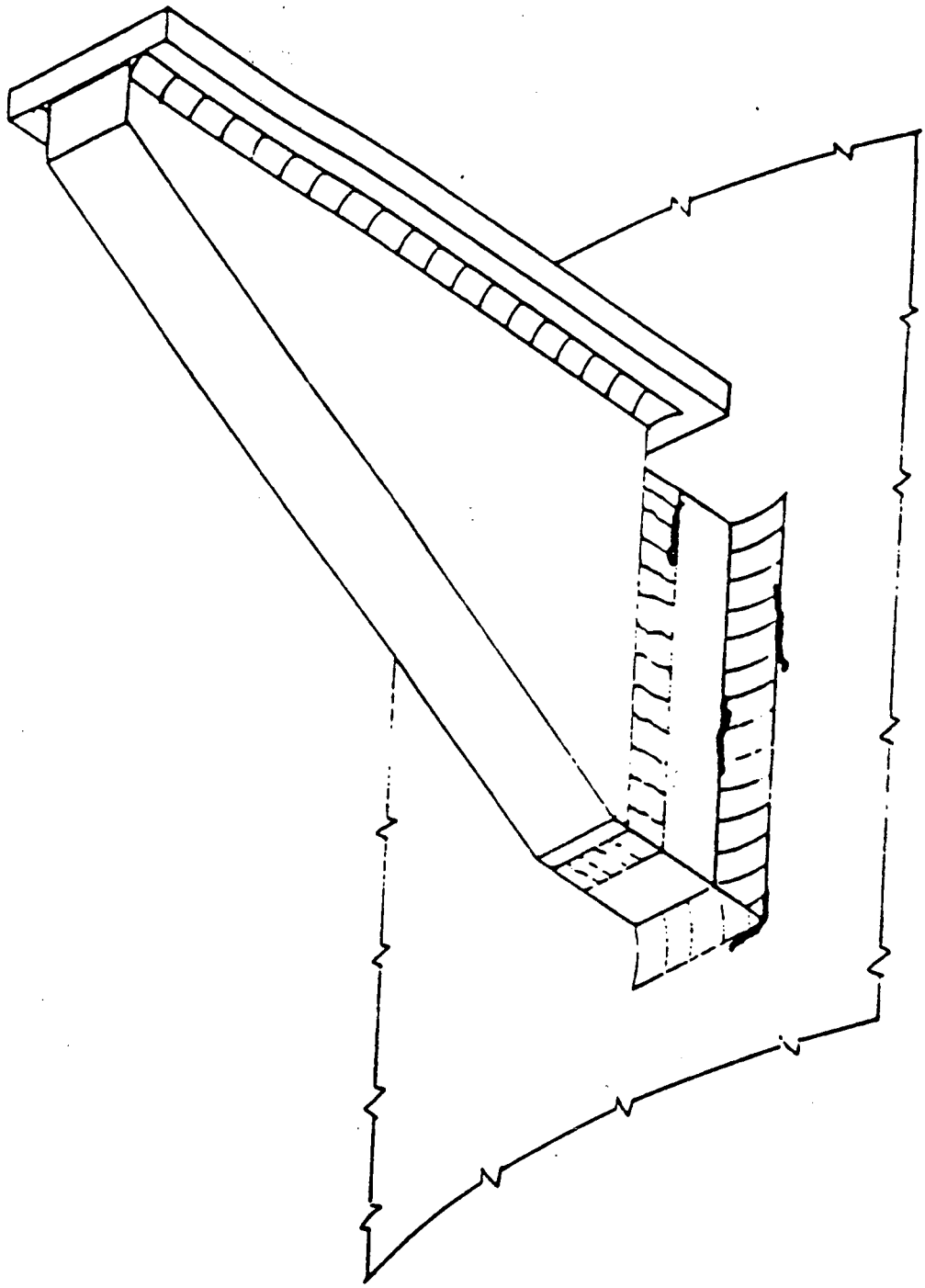
| | |
|---|---|
| INSPECTION PLAN | - EXAMINE ALL FOUR PIPES AT NOZZLES. |
| METHODS | - V.T., P.T., R.T. |
| REPAIR | - REMOVE PIPE UNTIL EXISTING PIPE IS M.T. CLEAR |
| ACCEPTANCE OF REPLACEMENT WELDS | - M.T., R.T |

# BRACKETS

| | |
|---|---|
| INSPECTION PLAN | - 100% ALL FEEDWATER SUPPORTS<br>ALL STEAM GENERATORS<br>o INCLUDES FEEDWATER RING SUPPORTS<br>o THERMAL SLEEVE SHELF BRACKETS<br>o FEEDWATER TEE RESTRAINTS |
| METHOD | - M.T., P.T |
| REPAIR | o GRIND & CONTOUR INDICATIONS<br>o WELD A THROUGH G BRACKETS AS REQUIRED<br>o REMOVE AND MODIFY NOZZLE SHELF BRACKETS |
| ACCEPTANCE | o M.T., U.T |

INDIAN POINT 2
STEAM GENERATORS
**ZONE IDENTIFICATION AND FEEDRING SUPPORTS**



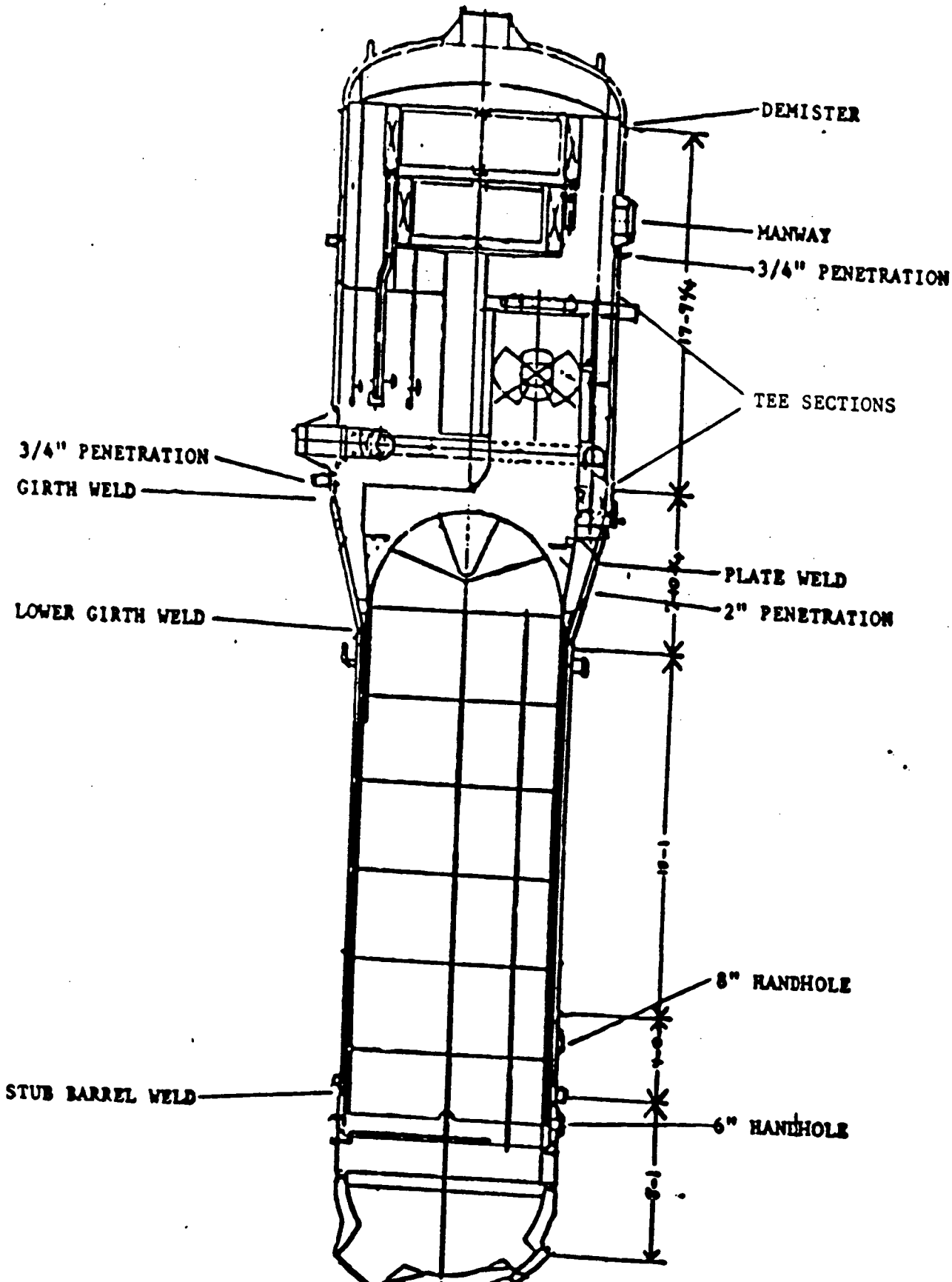


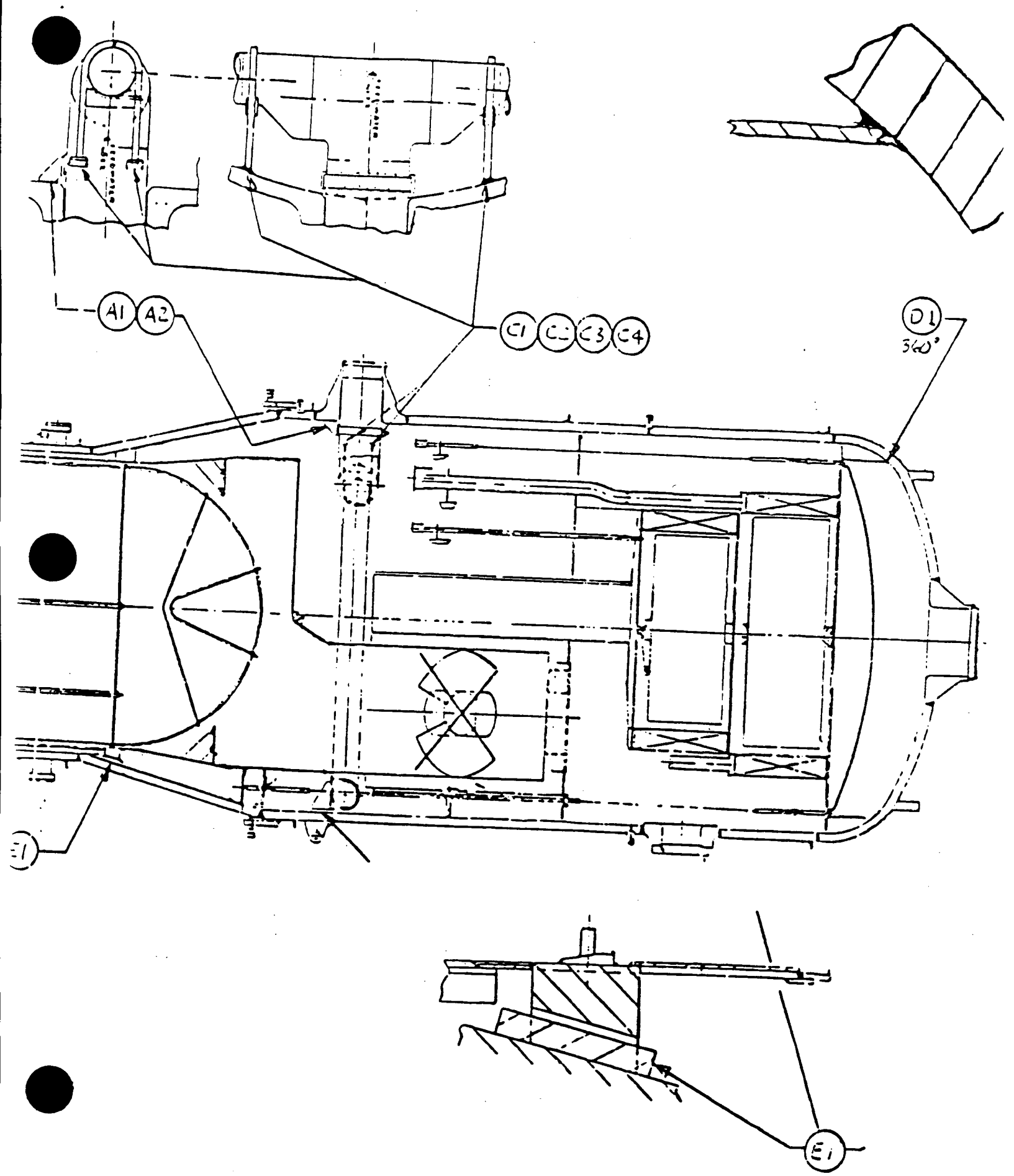
FEEDWATER RING
SUPPORT BRACKET
A-B-C LOCATIONS

# EXPANDED INSPECTIONS

| | |
|---|---|
| STEAM SPACE | |
| DEMISTER TO HEAD | SG 24 , VT |
| MANWAY | SG 21 MT |
| 3/4" PENETRATION | SG 21 , VT |
| PLATE WELDS | VT |
| T SECTIONS | VT |
| WATER SPACE | |
| 3/4" INSTRUMENT PENETRATION | - SG 22, 3VT |
| LOWER GIRTH WELD (TRANS. CONT) | - SG 21,22, 1/3 UT |
| CONE LONGIT. WELD | - SG 21,22 VT |
| NE PLATE | - SG 21,22 1/3 UT |
| 8" HANDHOLE | - SG 23 PT |
| 6" HANDHOLE | - SG 23 PT |
| 2" PENETRATION | - SG 22 PT T.B.D |
| STUB BARREL | |
| ATTACHMENT WELD | - SG 21 UT |
| T SECTIONS | - SG 21,24 VT |
| FEEDWATER LINE/NOZZLES | |
| THERMAL SLEEVE | - ALL VT |
| AT SG | - ALL VT |
| AT AFW INJECTION | - 22 VT |

Indian Point 2
Steam Generator




A1
A2
C1
C2
C3
C4
D1
360°
E1
E1

# CONCLUSIONS OF 1990 INSPECTIONS

- CRACKS WERE FOUND ONLY IN THE UPPER AREA OF THE TRANSITION REGION

- NO CRACKS WERE FOUND ABOVE OR BELOW THIS AREA

- INSPECTIONS AT THE LOWER TRANSITION GIRTH WELDS AND AT THE STUB BARREL TOOPCYLINDER WELD BOUND THE LOWER CYLINDER SHELL WELDS

# METALLURGICAL EVALUATIONS

- TO ESTABLISH THE CAUSE AND MECHANISM OF CRACKING
- TO ESTABLISH MECHANICAL PROPERTIES OF THE MATERIAL TAKEN FROM SERVICE

# METALLURGICAL EVALUATIONS

- INVESTIGATION OF BOAT SAMPLES
- MECHANICAL PROPERTY MEASUREMENTS

# METALLURGICAL INVESTIGATIONS

1989 OUTAGE:

ONE BOAT FROM GIRTH WELD OF SG #22

ONE BOAT FROM GIRTH WELD OF SG #24

1990 OUTAGE:

ONE BOAT FROM GIRTH WELD OF SG #21

ONE BOAT FROM GIRTH WELD OF SG #22

ONE BOAT FROM TRANSITION CONE OF SG #22

ONE BOAT FROM NOZZLE BORE OF SG #24

FEEDRING SUPPORTS FROM SG #21 AND #24

SURFACE DEPOSITS TAKEN FROM GIRTHWELD, NOZZLE BORE AND LOW RANGE LEVEL TAP.

# METALLURGICAL INVESTIGATION OF CRACKING

SURFACE EXAMINATIONS

METALLOGRAPHIC EXAMINATIONS

FRACTOGRAPHIC EXAMINATIONS

HIGHER RESOLUTION REPLICA TEM EXAMINATIONS

CHEMISTRY EVALUATIONS

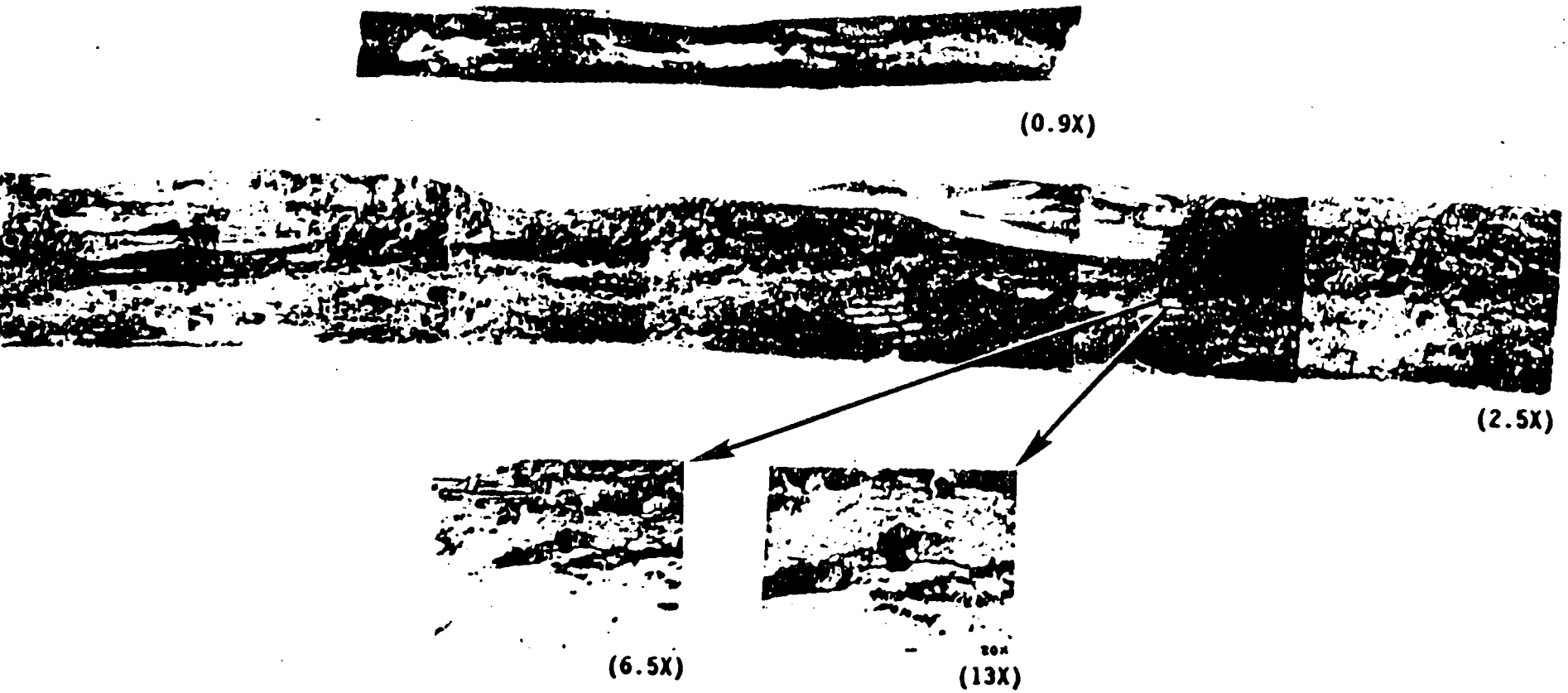
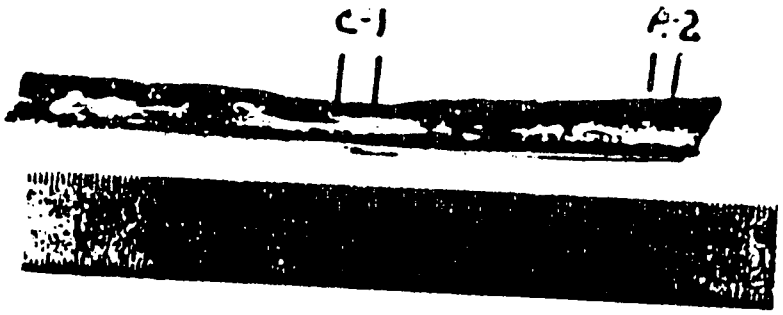
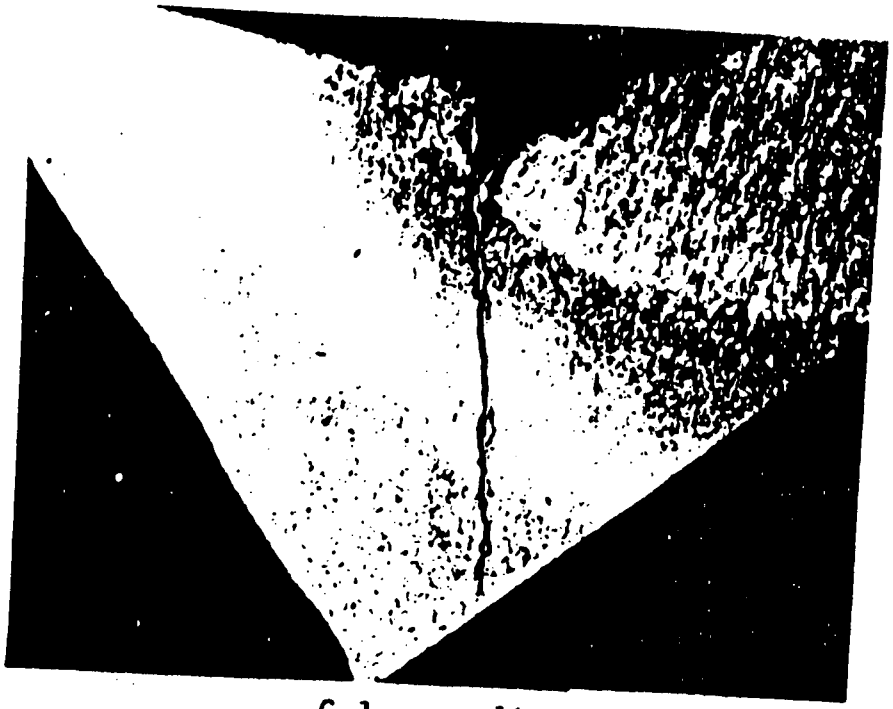


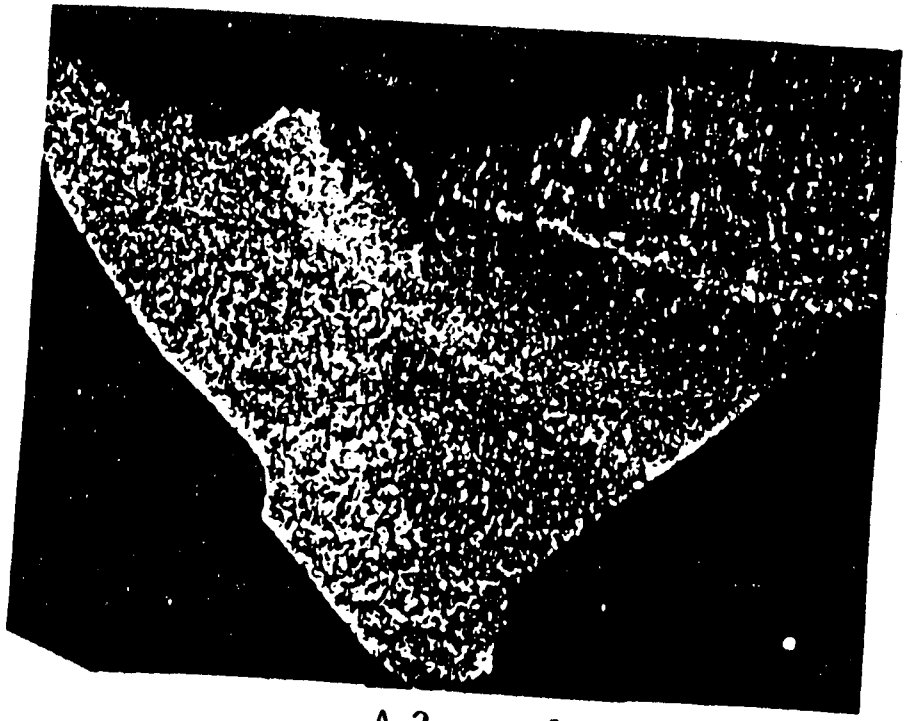

FIGURE 2.1 As-received surface appearance of the Boat 1 sample from Steam Generator 24 girth weld , illustrating the surface pitting and cracking seen on the ID surface.

S.G. 24 BOAT 1



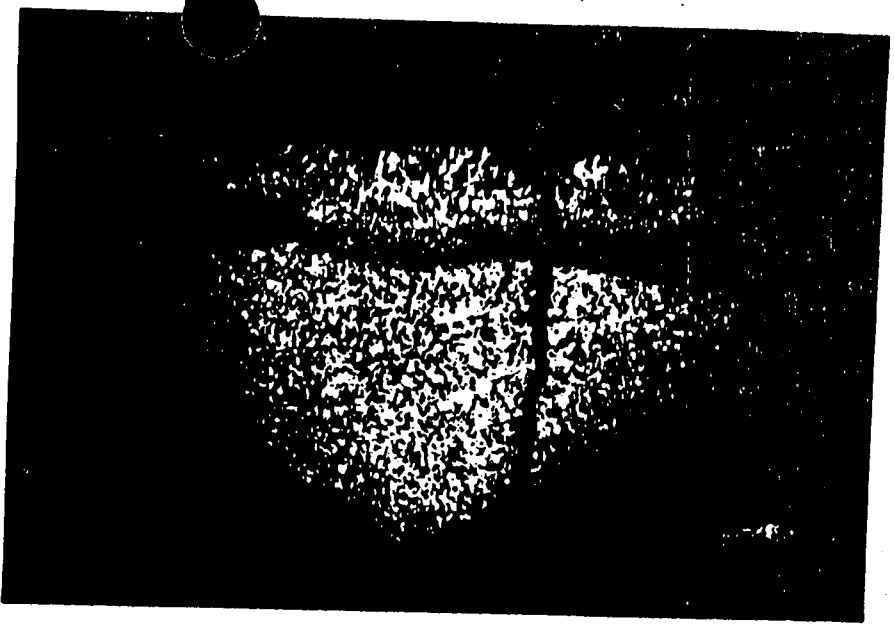



C-1 14x

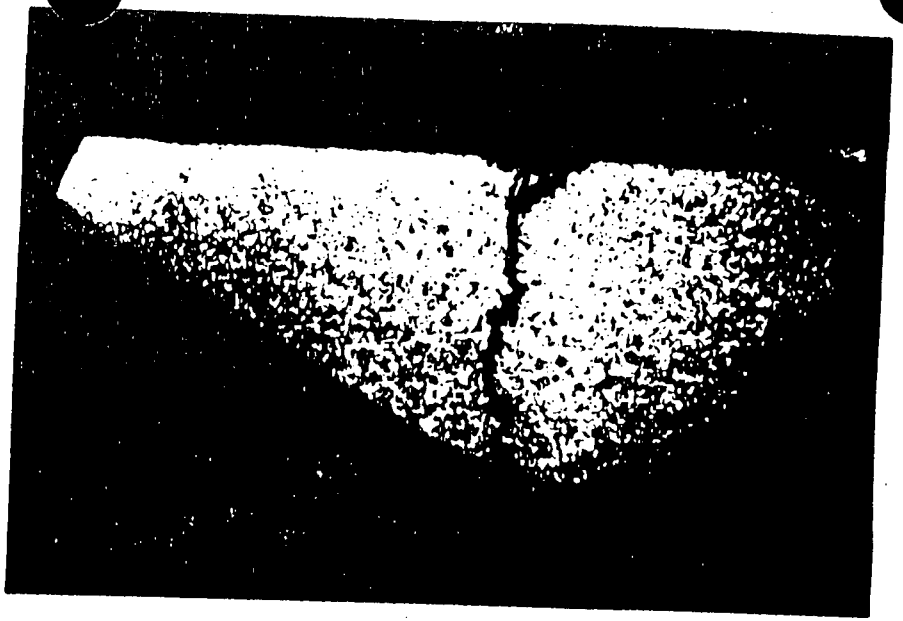


A-2 14x

FIGURE 2.4 Metallographic examination results illustrating the cracking morphology and microstructure seen in Boat 1.



Cb 6X



Cd 6X

25X

25X

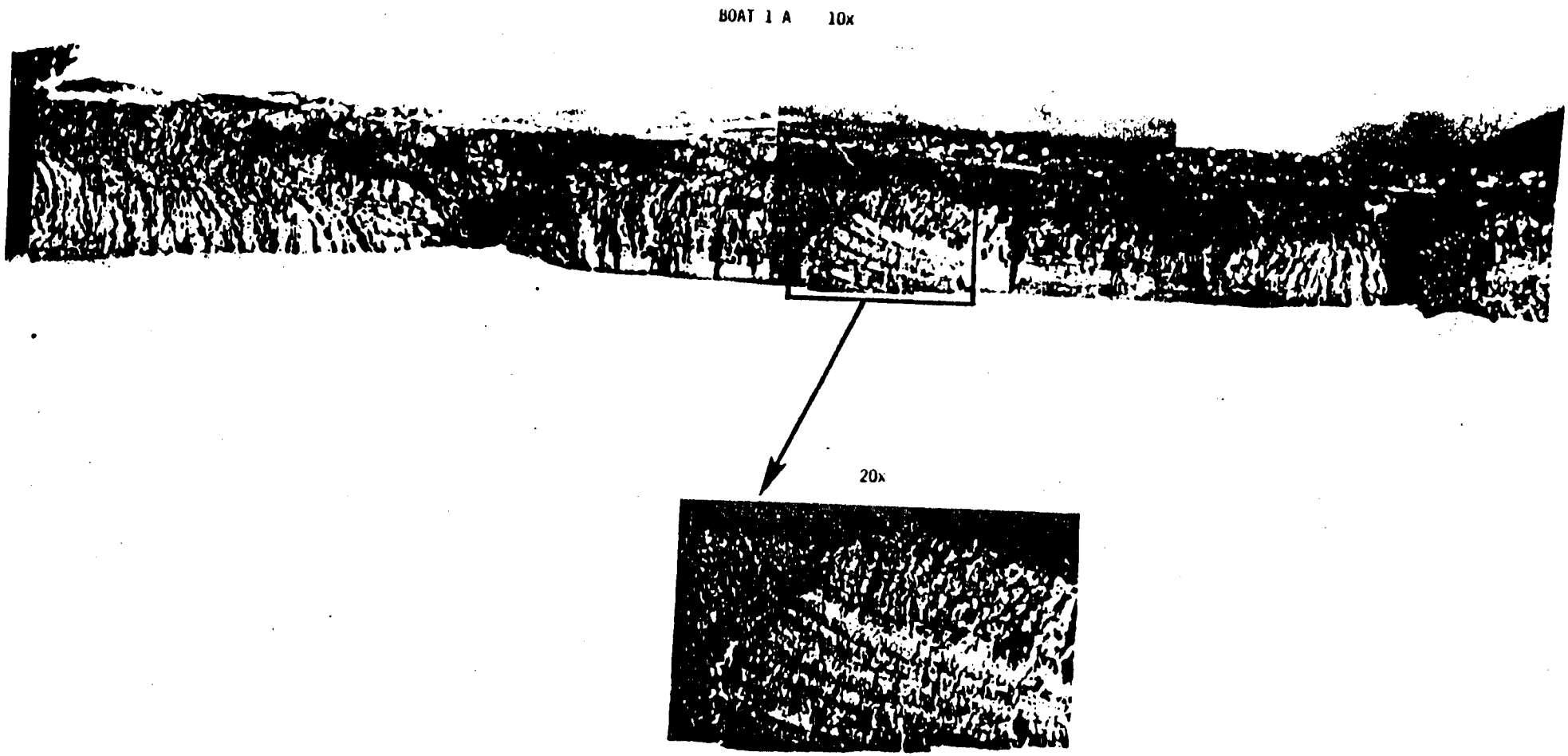



FIGURE 2.11 Light optical fractography results illustrating the beach marks seen in the endoxed fracture face in Boat 1.

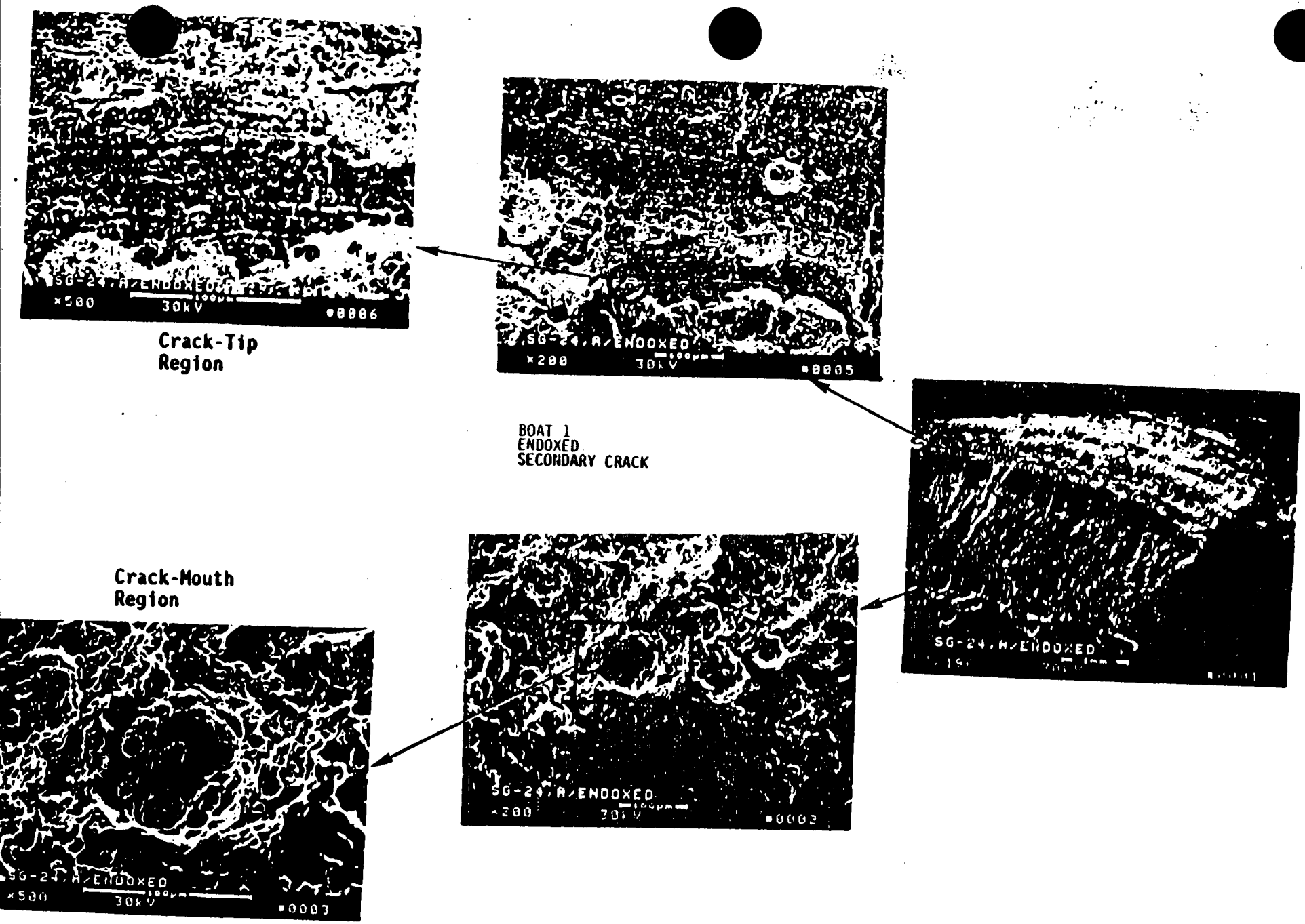
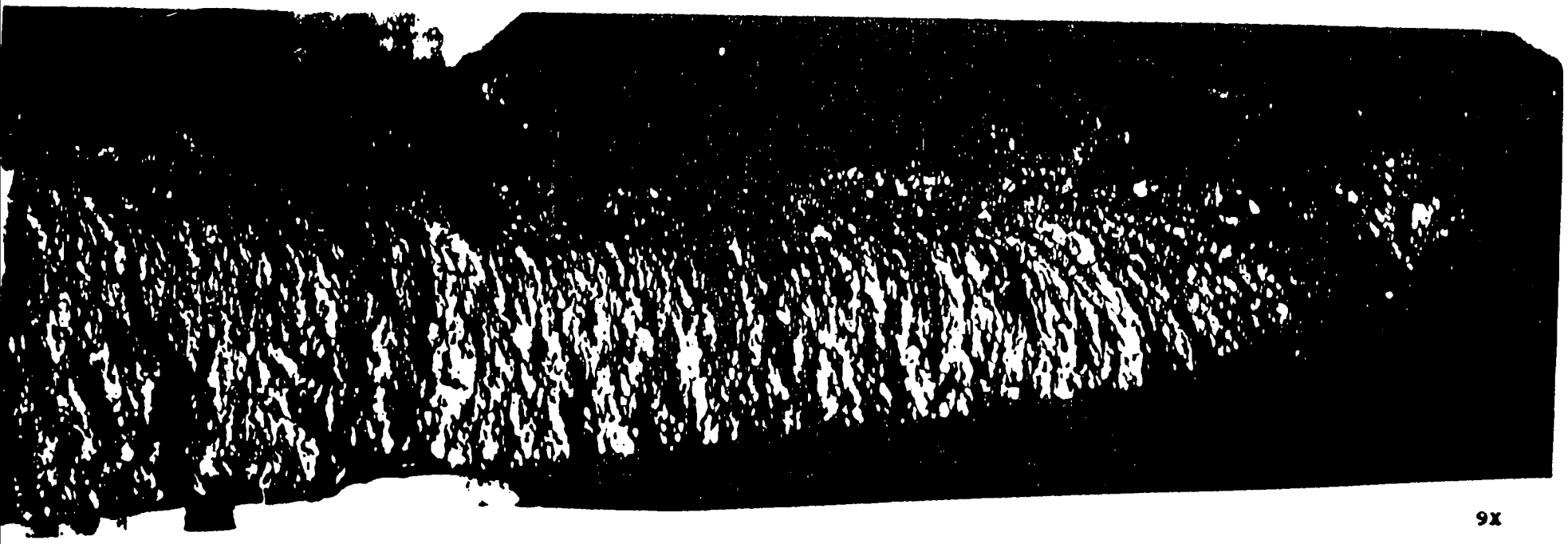


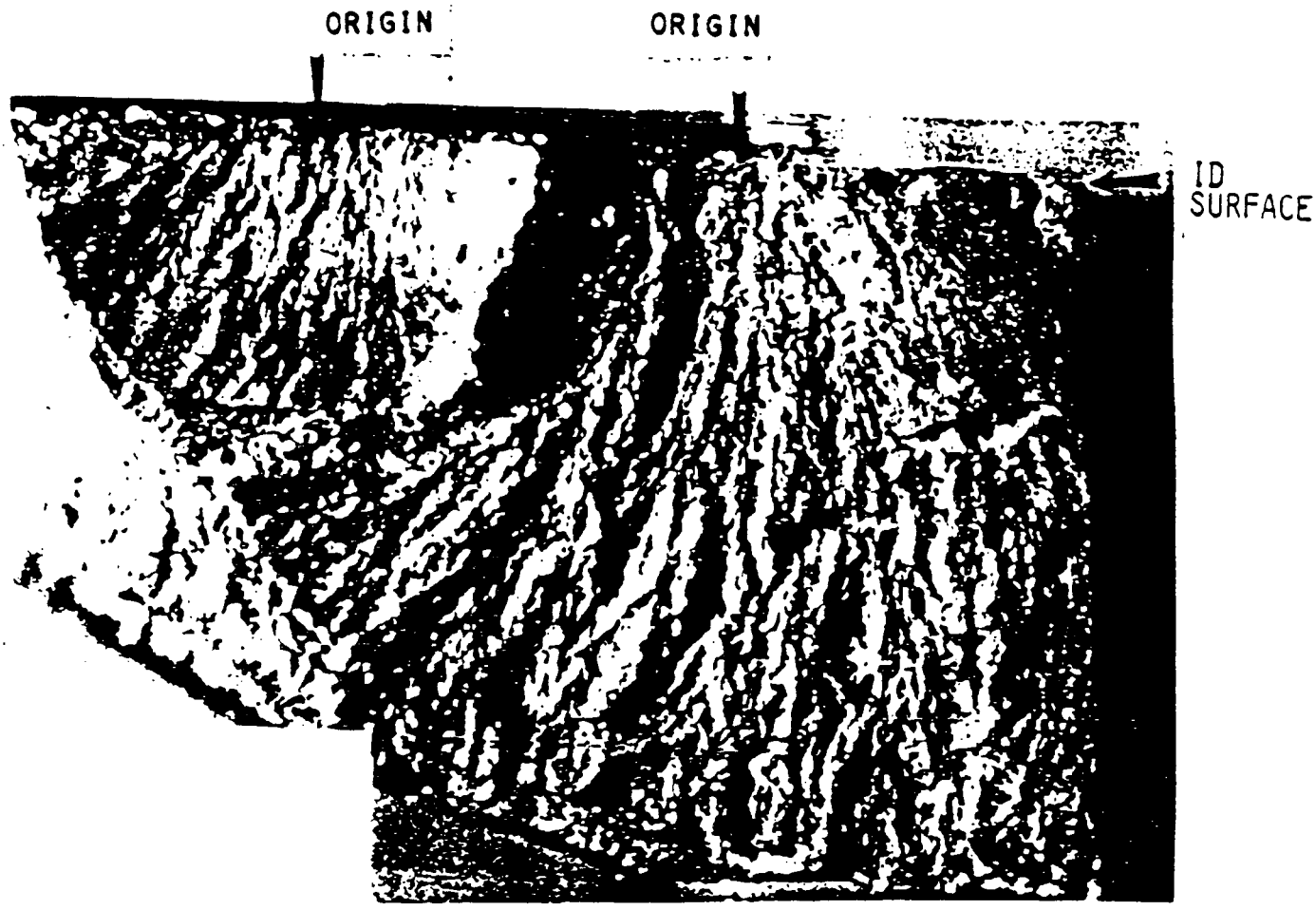

FIGURE 2.15 Scanning electron fractograph of the endoxed fracture face in Boat 1 illustrating the presence of fatigue striations.

S/G 22 TRANSITION CONE CRACK

PIECE A

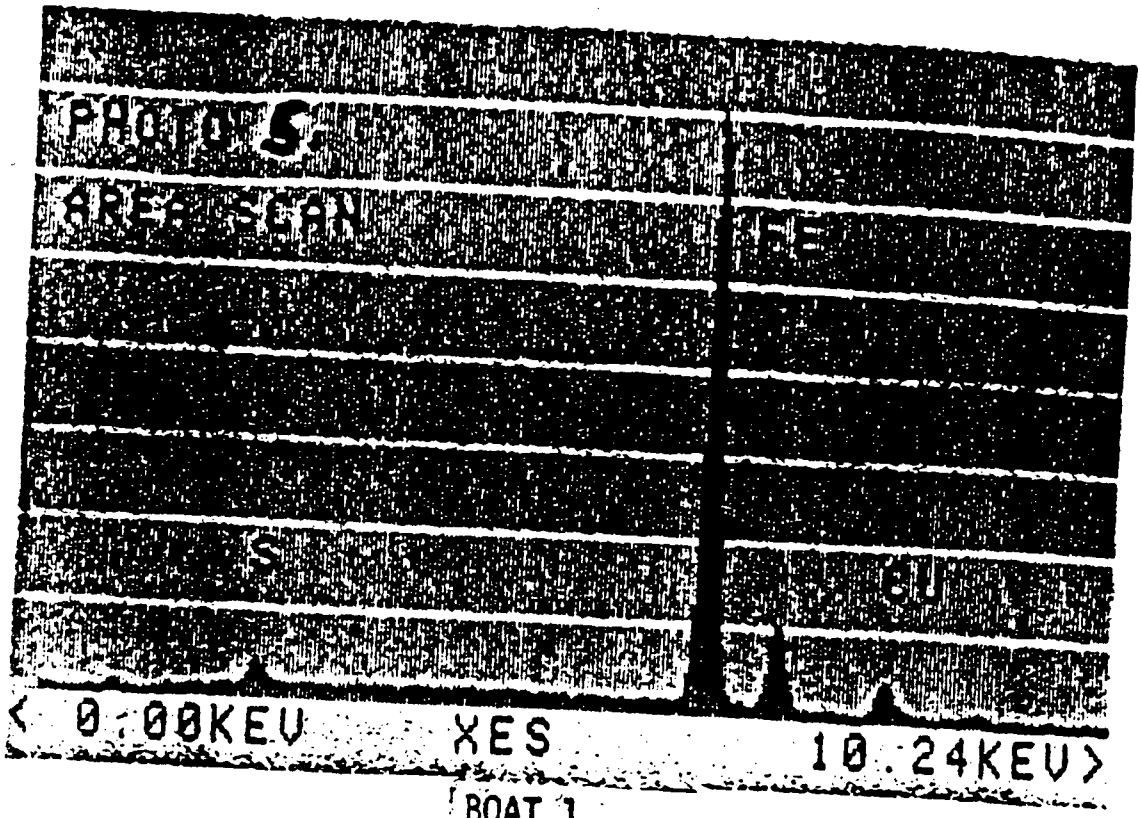


9X

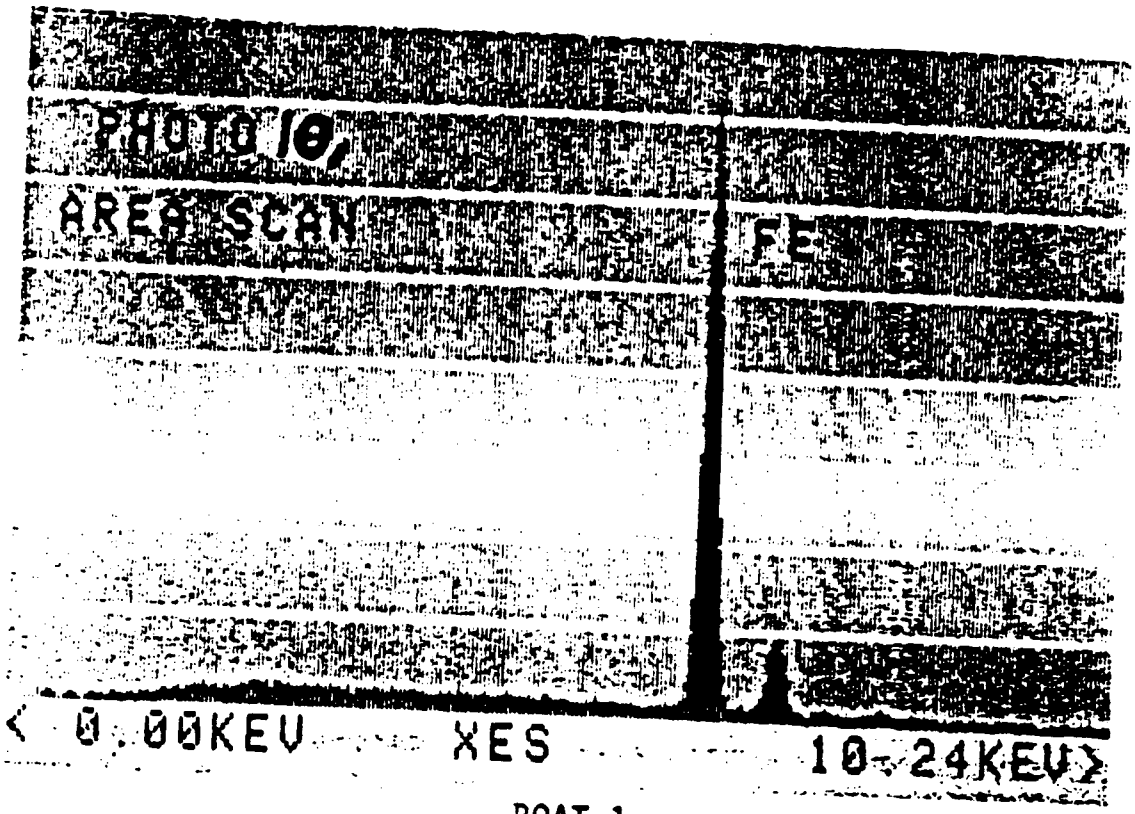



BOAT 2
SECTION C-2
(32x)

FIGURE 2.12 Light optical fractograph illustrating the fracture morphology seen in Boat 2.

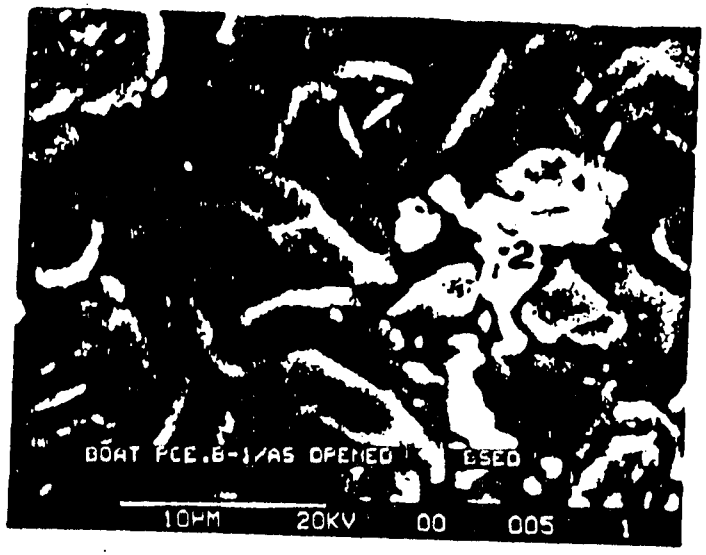



BOAT 1
CRACK MOUTH

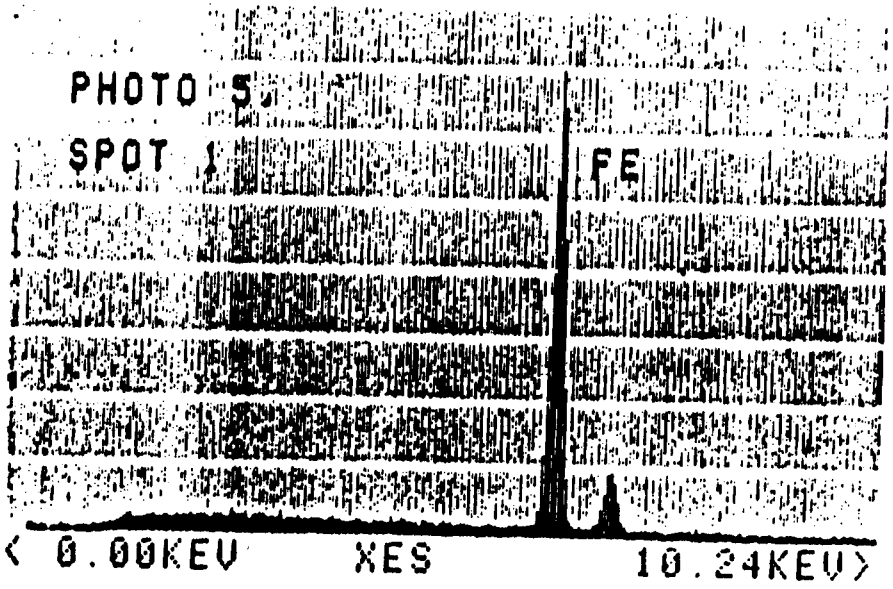



BOAT 1
CRACK TIP

FIGURE 2.19 Energy dispersive X-ray analysis results of the crack deposits in Boat 1.




BOAT -1
CRACK MOUTH
CHEMISTRY



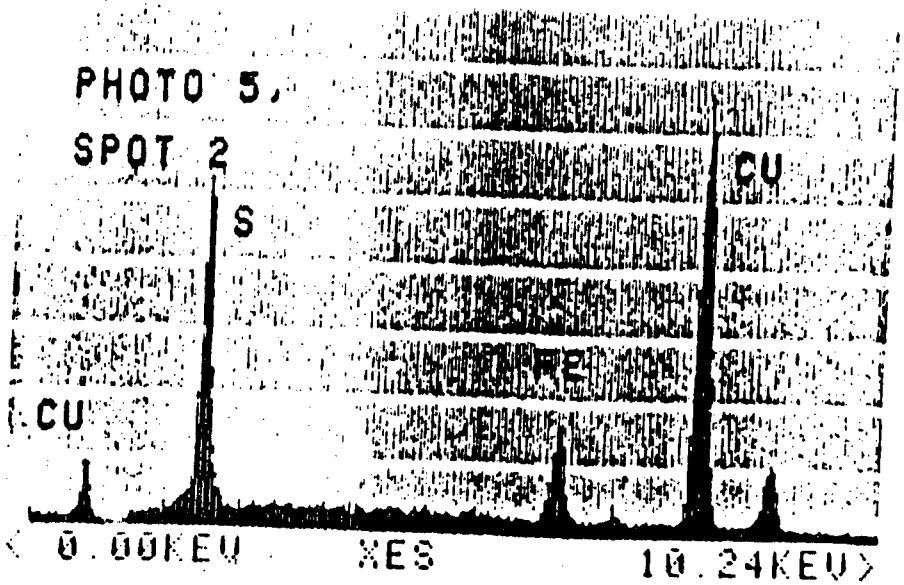




FIGURE 2.18 Energy dispersive X-ray analysis results of the crack deposits in Boat 1.

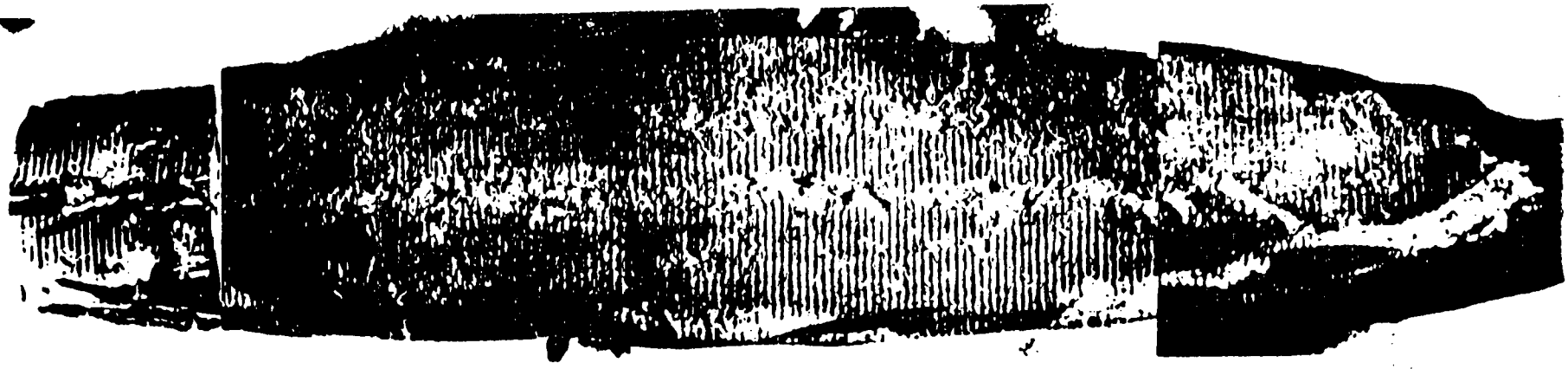
# SUMMARY OF RESULTS

## GIRTH WELD/TRANSITION CONE CRACKS

- SURFACE PITTING AND OXIDE DEPOSITS WERE SEEN AT THE GIRTH WELD REGIONS
- MULTIPLE CRACK INITIATION WAS SEEN AT THE BOTTOM OF THE OXIDE FILLED PITS AND CRACKS WERE SEEN FORMED BY LINKAGE OF SURFACE PITS
- CRACKING WAS LOCATED AT EITHER THE WELD METAL, WELD METAL-TO-BASE METAL INTERFACE OR IN THE HEAT AFFECTED REGIONS WHERE APPLIED AND RESIDUAL STRESSES ARE LIKELY TO BE HIGHER
- CRACKS WERE FILLED WITH HEAVY OXIDE DEPOSITS ALL THE WAY TO THE TIP OF THE CRACKS
- CRACKING WAS TRANSGRANULAR AND EXHIBITED MINOR BRANCHING IN LOCAL AREAS, BUT GENERALLY FOLLOWED STRAIGHT, RADIALLY OUTWARD DIRECTION OF THE STEAM GENERATORS
- COPPER WAS CONSISTENTLY PRESENTLY IN THE CRACK DEPOSITS
- FRACTOGRAPHIC EXAMINATIONS REVEALED TWO DISTINCTLY DIFFERENT MODES OF CRACK PROPAGATION DEPENDING ON THE SAMPLE EXAMINED
- THE FRACTURE MORPHOLOGY IN SOME BOATS SHOWED EVIDENCE OF EXTENSIVE BEACH MARKS AND FINE FATIGUE STRIATIONS SUGGESTING CRACK EXTENSION UNDER CYCLIC LOADING CONDITIONS
- THE FRACTURE MORPHOLOGY IN THE OTHER BOATS FOLLOWED SMOOTH CONTINUOUS CRACK EXTENSION FLOW LINES CHARACTERISTIC OF STRESS CORROSION CRACKING UNDER STATIC LOADING CONDITIONS

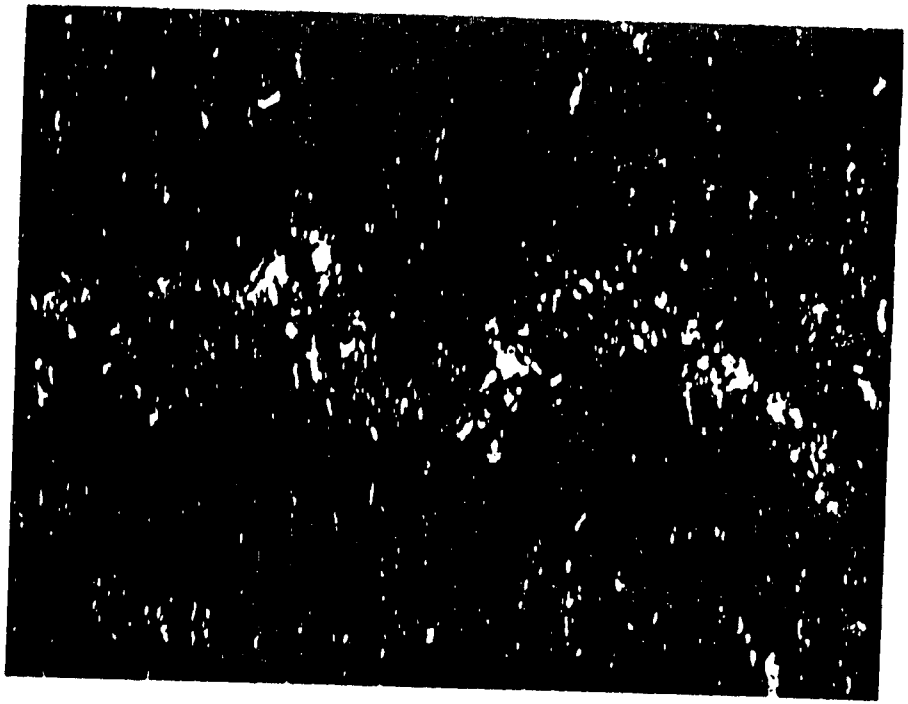
## CONCLUSIONS FROM SHELL SAMPLE EXAMINATIONS

- CRACK MECHANISMS ARE CORROSION FATIGUE AND STRESS CORROSION CRACKING IN THE SHELL REGIONS
- PITTING PLAYS A MAJOR ROLE IN THAT CRACKS INITIATE WITHIN THE PITS
- OXIDIZING ENVIRONMENT OF CU AND OXYGEN FOUND IN ALL SHELL SAMPLES
- CRACKING IS LOCATED IN THE WELD METAL, HEAT AFFECTED ZONE AND WELD TO BASE METAL INTERFACE



S/G 24 NOZZLE BORE CRACK

SURFACE



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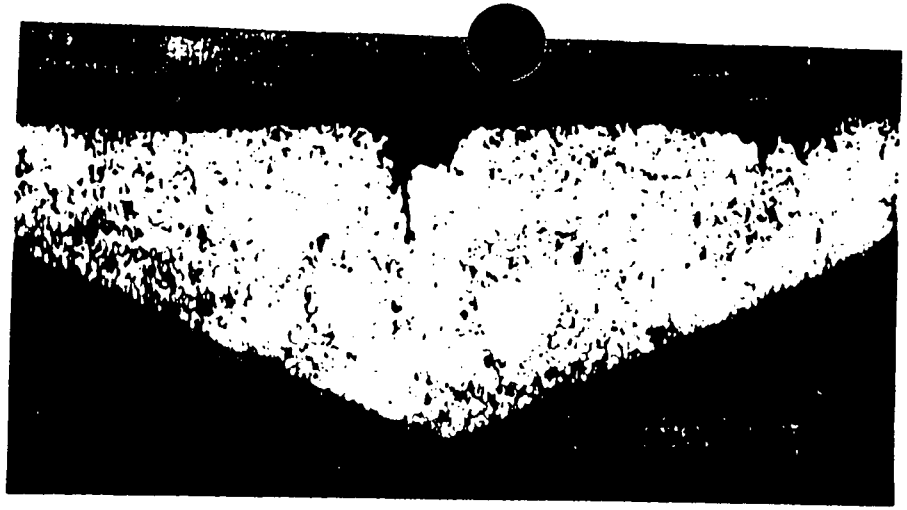


8X

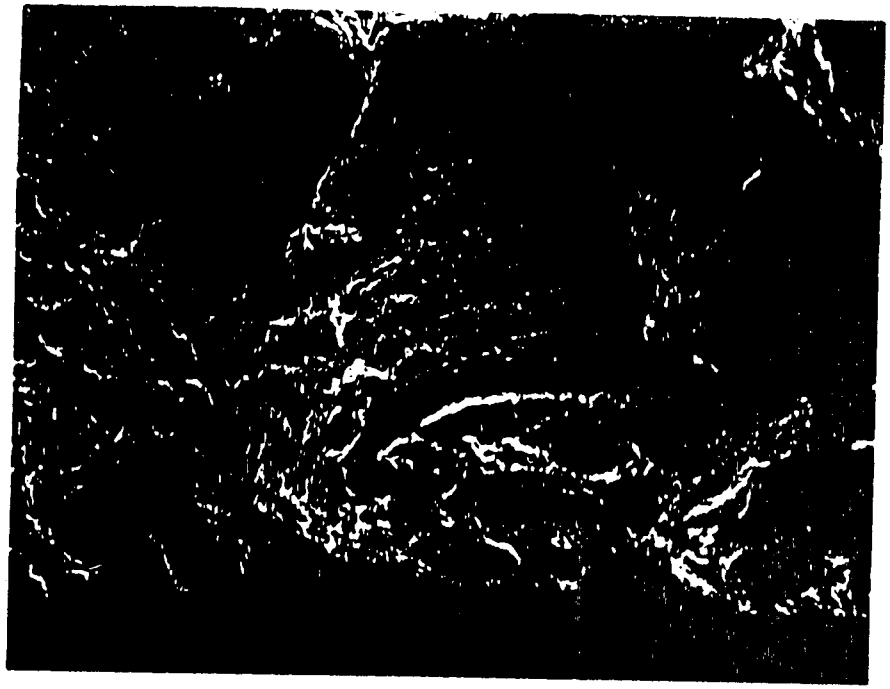
S/G 24 NOZZLE BORE CRACK

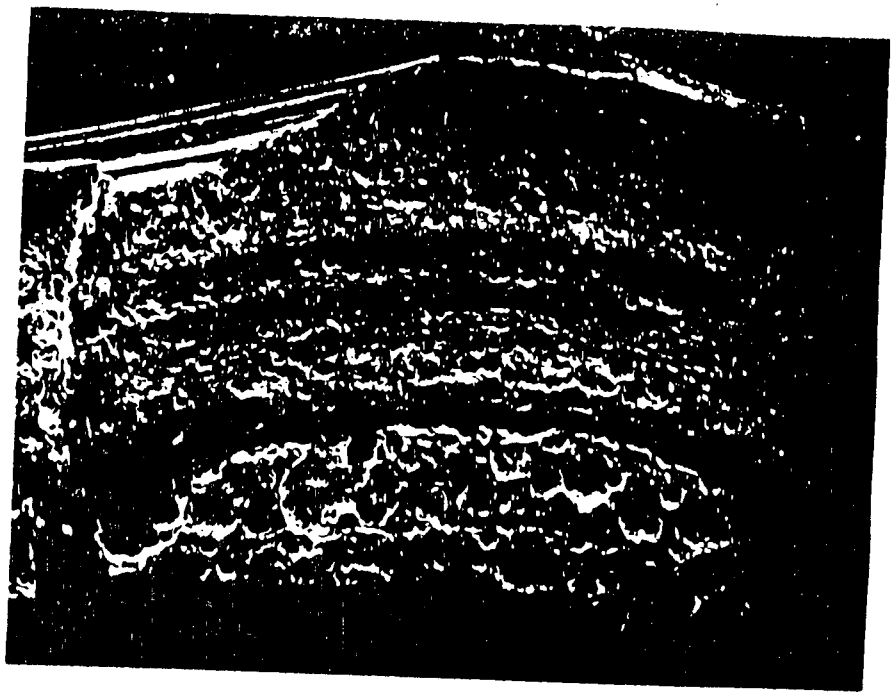
PIECE D

50X

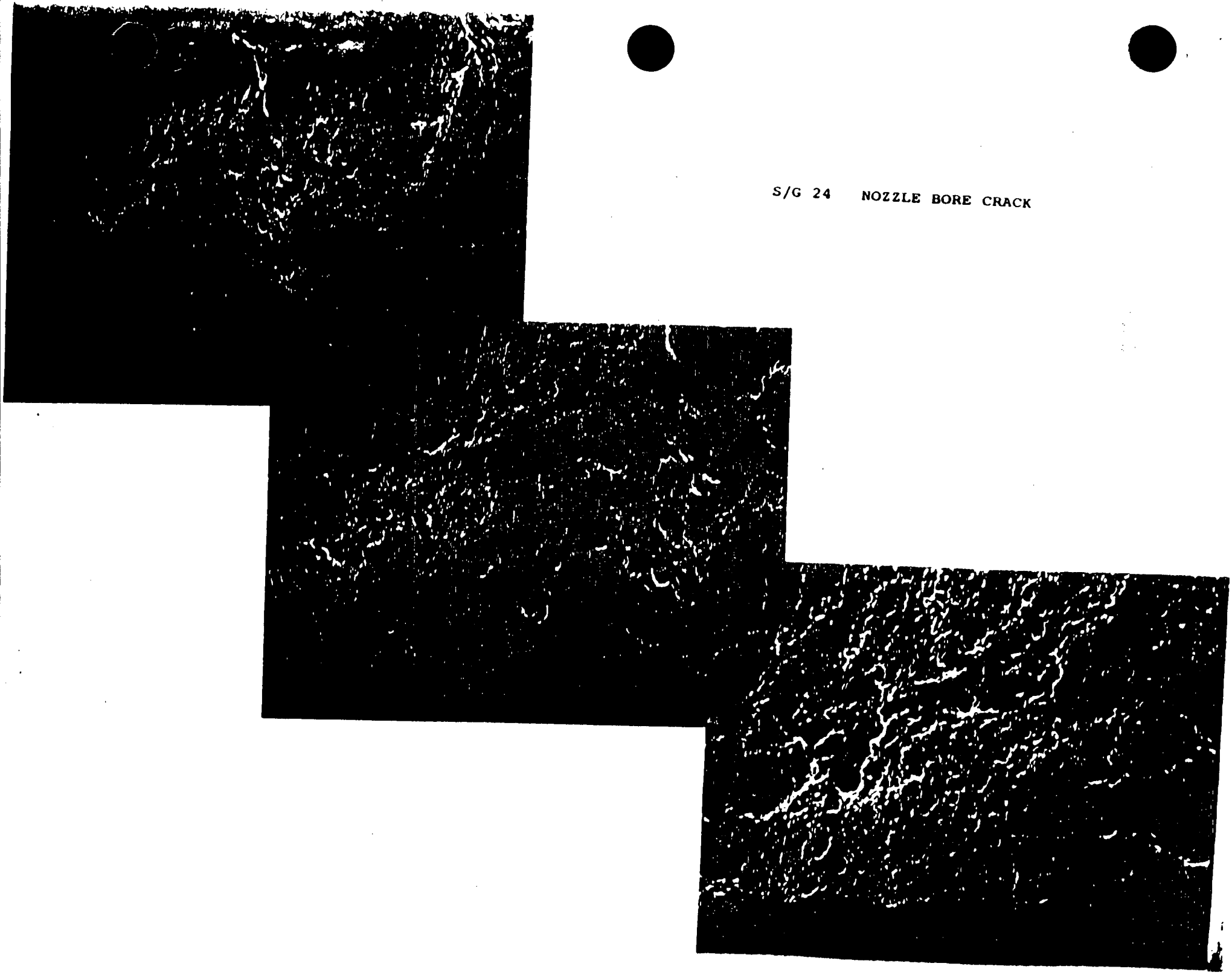
50X

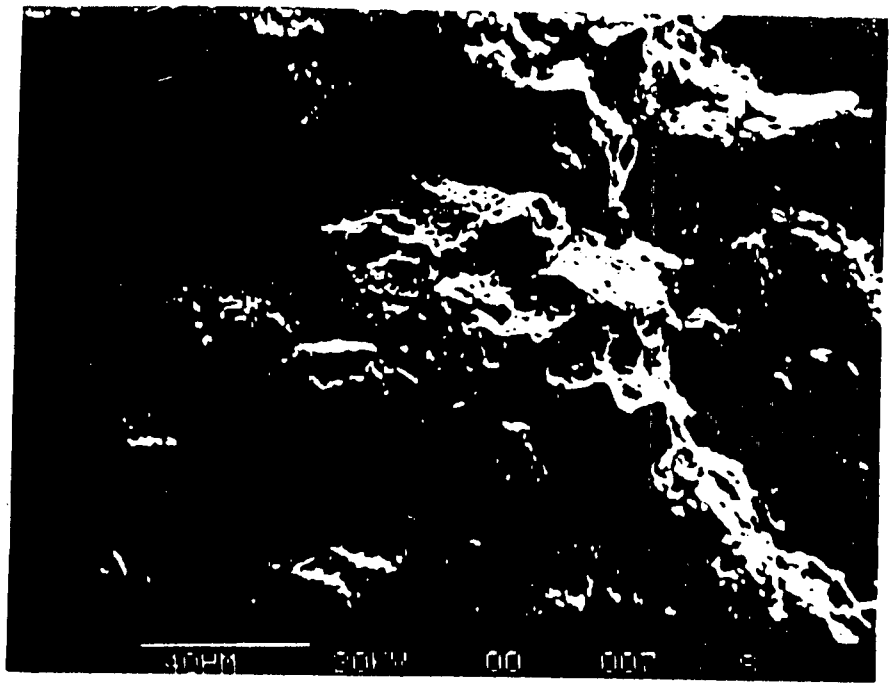
S/G 24 NOZZLE BORE CRACK

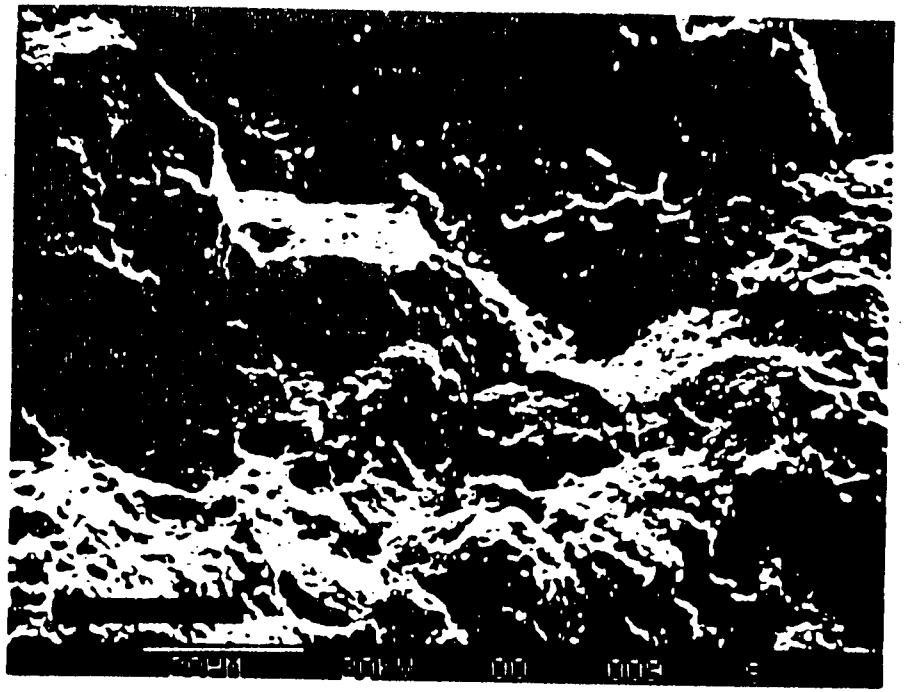




S/G 24 NOZZLE BORE CRACK







Fracture Morphology of a Freshly Opened and Endoxed Fracture Face of a Crack in Boat — A (Sample M1)

# SUMMARY OF RESULTS

## FEEDWATER NOZZLE BORE CRACKING

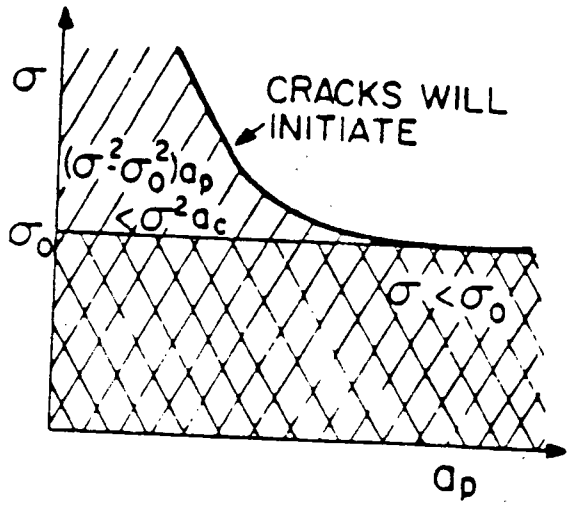
- CRACKING WAS AXIAL TO THE NOZZLE
- CRACKING WAS INITIATED FROM OXIDE FILLED SURFACE PITS
- OXIDE DEPOSITS AND THE PRESENCE OF COPPER WAS SEEN IN THE CRACKS
- FRACTURE MORPHOLOGY SHOWED EVIDENCE OF BEACH MARKS AND FINE FATIGUE STRIATIONS INDICATING CRACK EXTENSION UNDER THE INFLUENCE OF CYCLIC LOADS
- CRACK EXTENSION INVOLVED MULTITUDE OF LOAD CYCLES

## CONCLUSIONS FROM NOZZLE SAMPLE

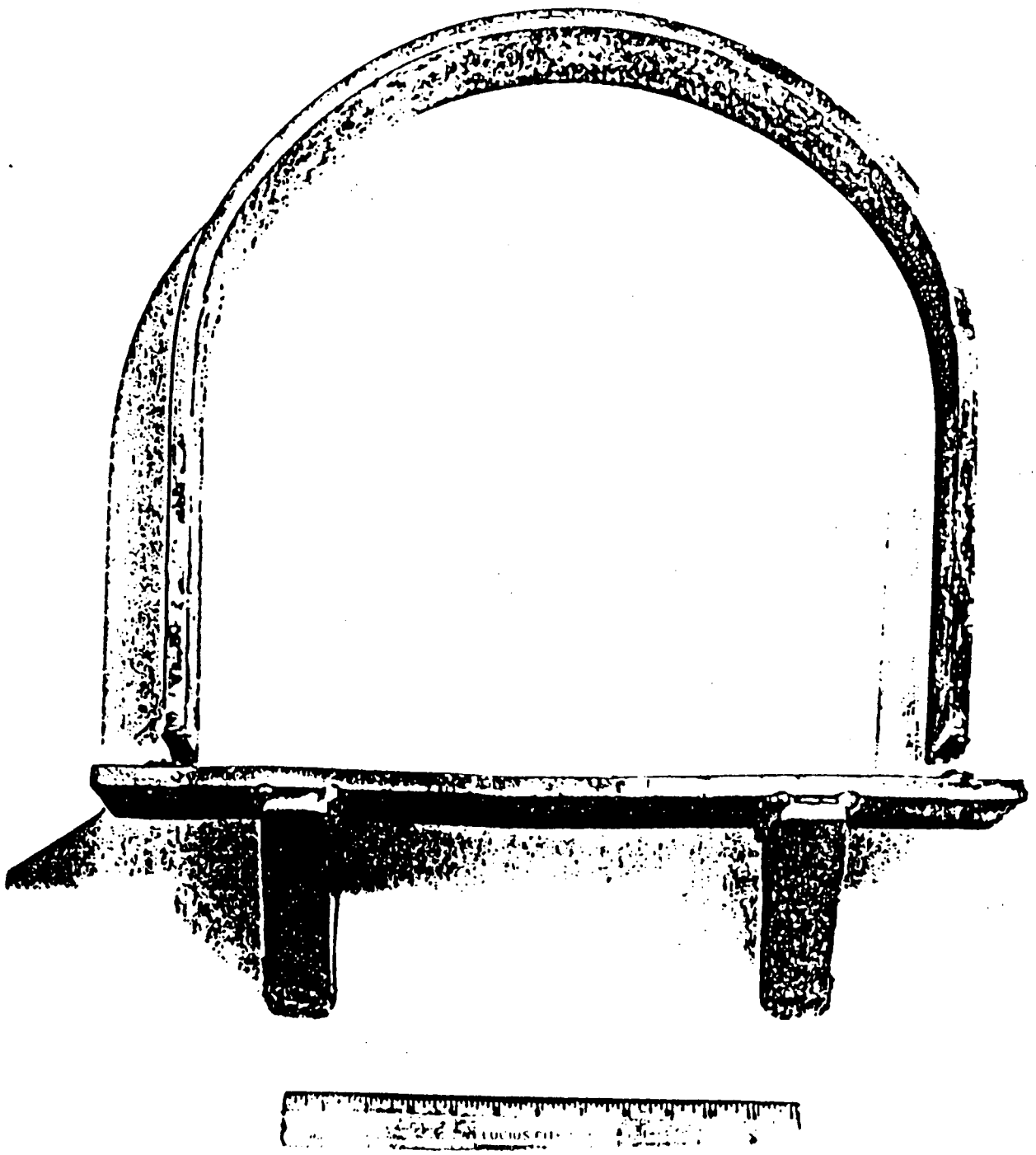
- CRACK MECHANISM IS CORROSION FATIGUE
  - MECHANISM CONSISTENT WITH ALL PRIOR SAMPLES FROM COUNTER BORE REGION
- CRACKS FOUND TO INITIATE IN PITS ALTHOUGH PITTING GENERALLY LESS SEVERE THAN FOUND AT GIRTH WELD
- OXIDIZING ENVIRONMENT

# MECHANISTIC CONSIDERATIONS

| | | |
|---|---|---|
| STAGE 1 | SURFACE PITTING | STRESSES (RESIDUALS AND APPLIED) CONTAMINANTS (CU, $O_2$)<br>HAZ MICROSTRUCTURE |
| STAGE 2 | CRACK INITIATION THE BOTTOM OF THE PIT. | • CRITICAL PIT SIZE<br>• (SURFACE ATTACK AND OXIDATION)<br><br>• ADEQUATE LOADS TO ACHIEVE $K_{ISCC}$, DELTA $K_{Th}$ |
| STAGE 3 | CRACK PROGRESSION | • CYCLIC LOADS<br>• STATIC. LOADS<br>• PRESENCE OF CU AND $O_2$ |



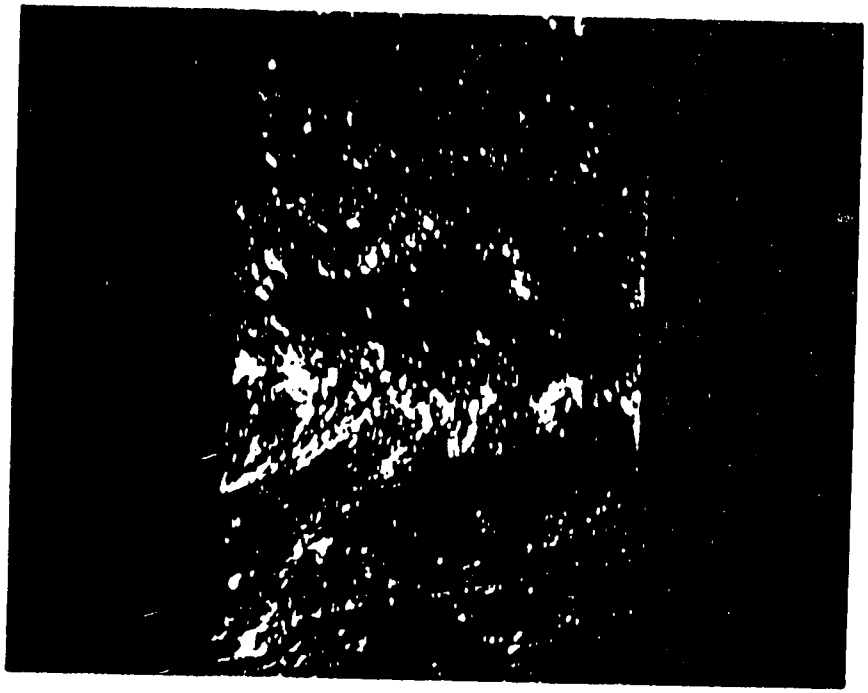

$$a_p = \frac{K_{ISCC}^2}{\sigma \pi^2}$$



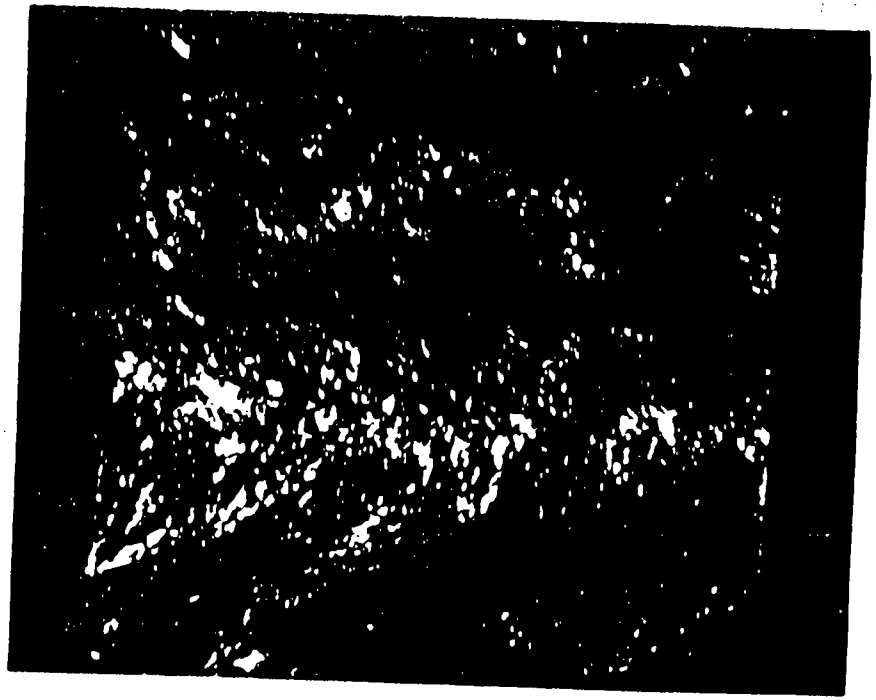
S/G 21 GUSSET WELD CRACK

C2-A1

SURFACE



6.3X



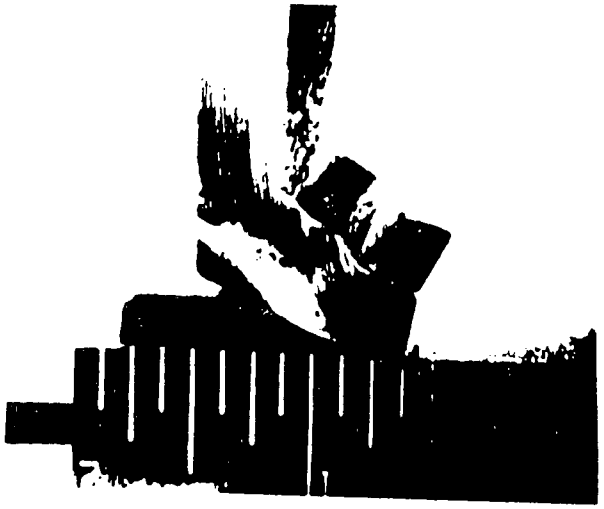
10X

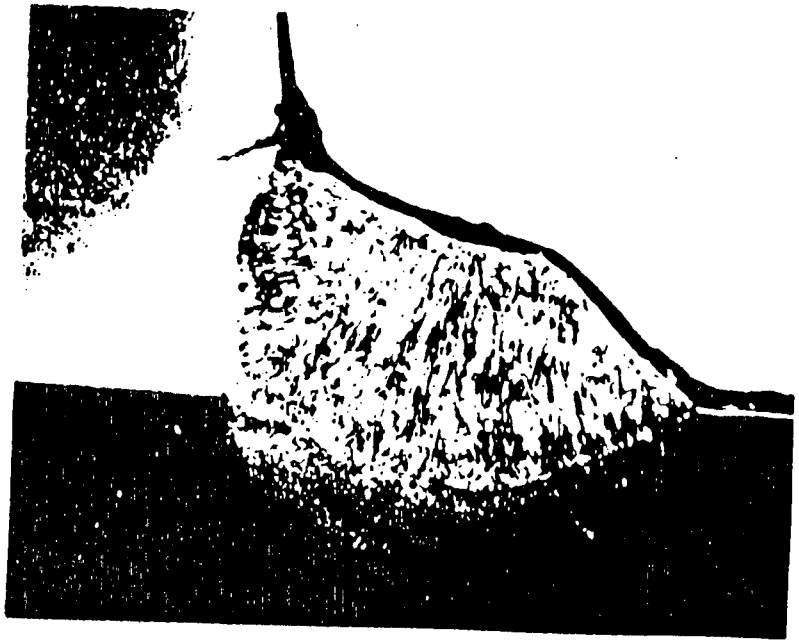
S/G 21 GUSSET WELD CRACK

ETCHED

32X

32X





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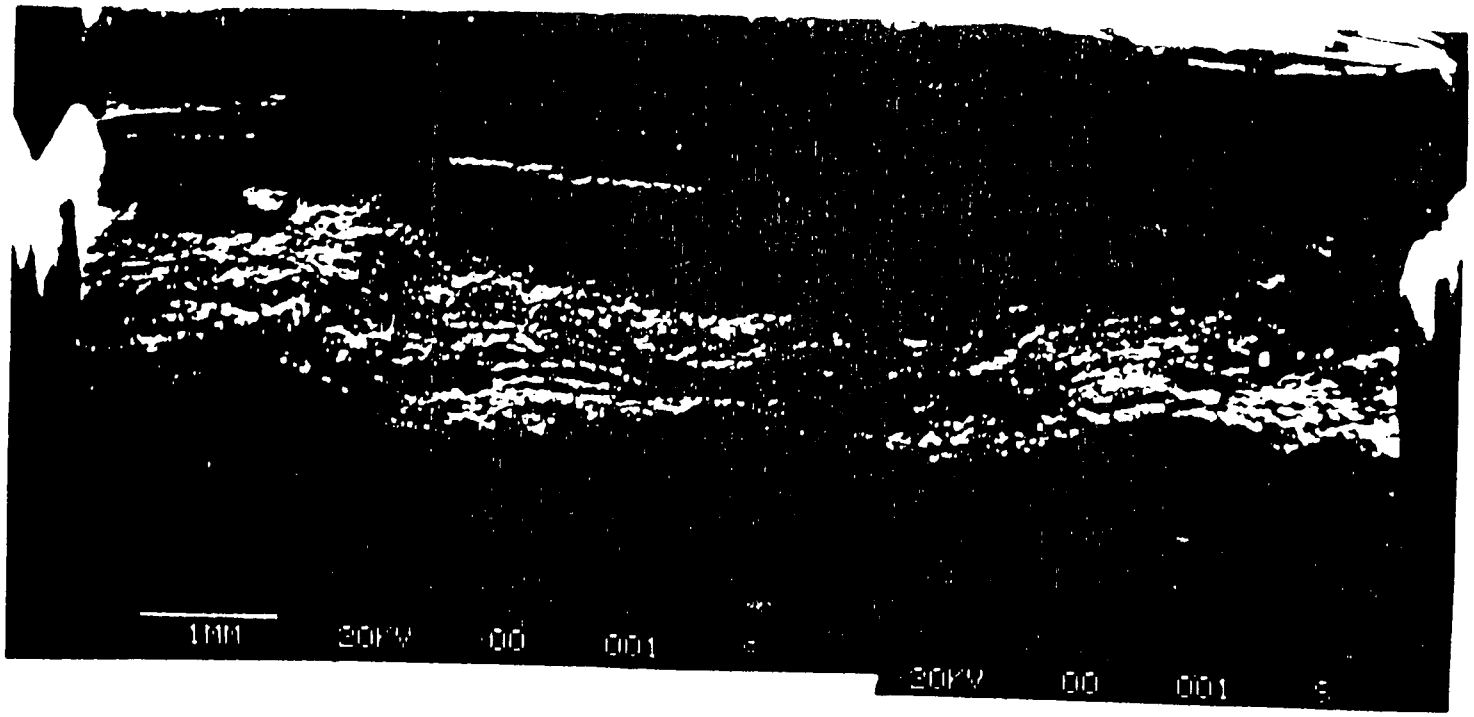
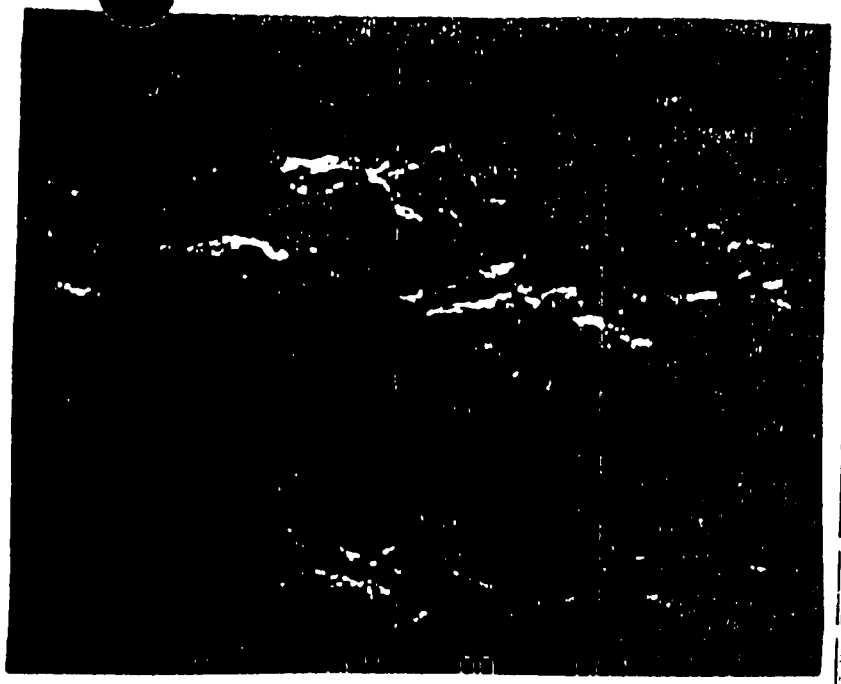
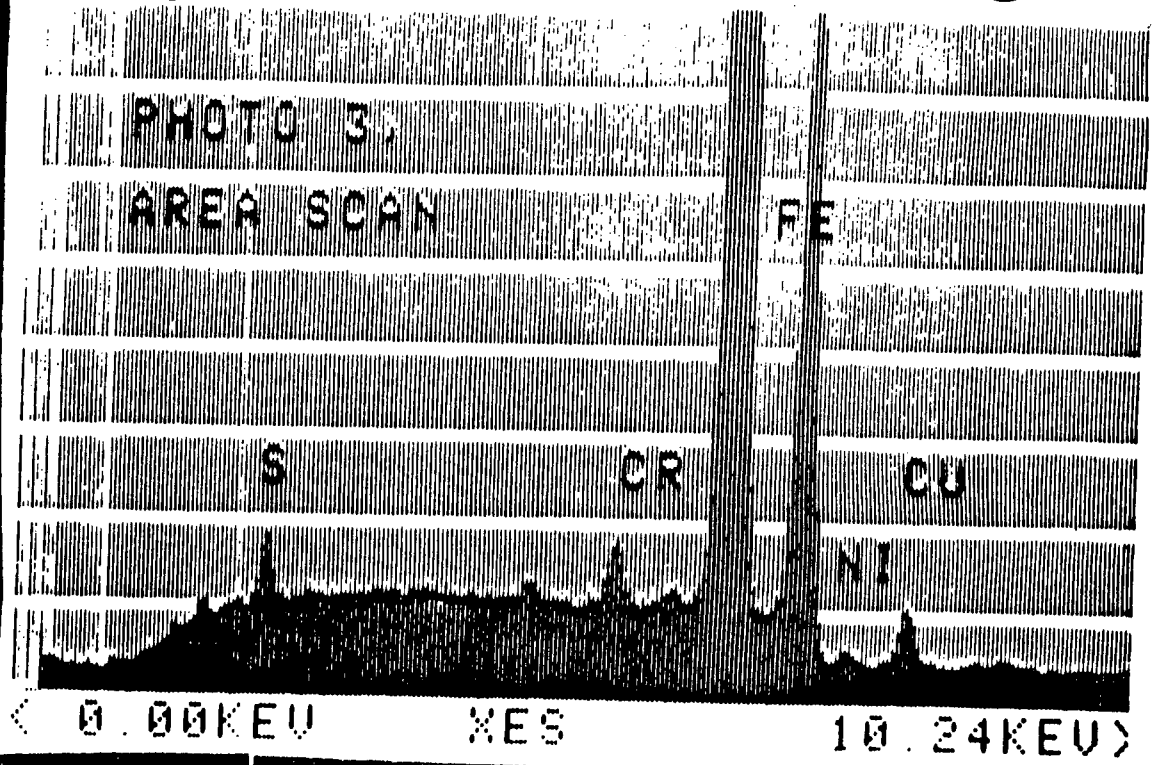
S/G 21 GUSSET WELD CRACK



S/G 21 GUSSET WELD CRACK





# SUMMARY OF RESULTS

## FEEDRING SUPPORTS

- CRACKING SEEN AT THE SHELF TO GUSSET WELD JOINTS
- THE CRACKS WERE BLUNT AND FILLED WITH HEAVY OXIDE DEPOSITS
- COPPER WAS SEEN IN THE CRACK DEPOSITS
- MAXIMUM CRACK DEPTH WAS 0.06 IN.
- NO EVIDENCE OF FATIGUE STRIATIONS SEEN
- FRACTURE MORPHOLOGY WAS CONSISTENT WITH STRESS CORROSION MECHANISM

# CONCLUSION FROM FEEDRING SUPPORT BRACKETS

- ENVIRONMENTALLY ASSISTED CRACKING. MOST LIKELY MECHANISM IS SCC.
- PITTING CONTROLLED INITIATION
- OXIDIZING ENVIRONMENT
- LONG TERM CRACK EXTENSION

# CONCLUSIONS

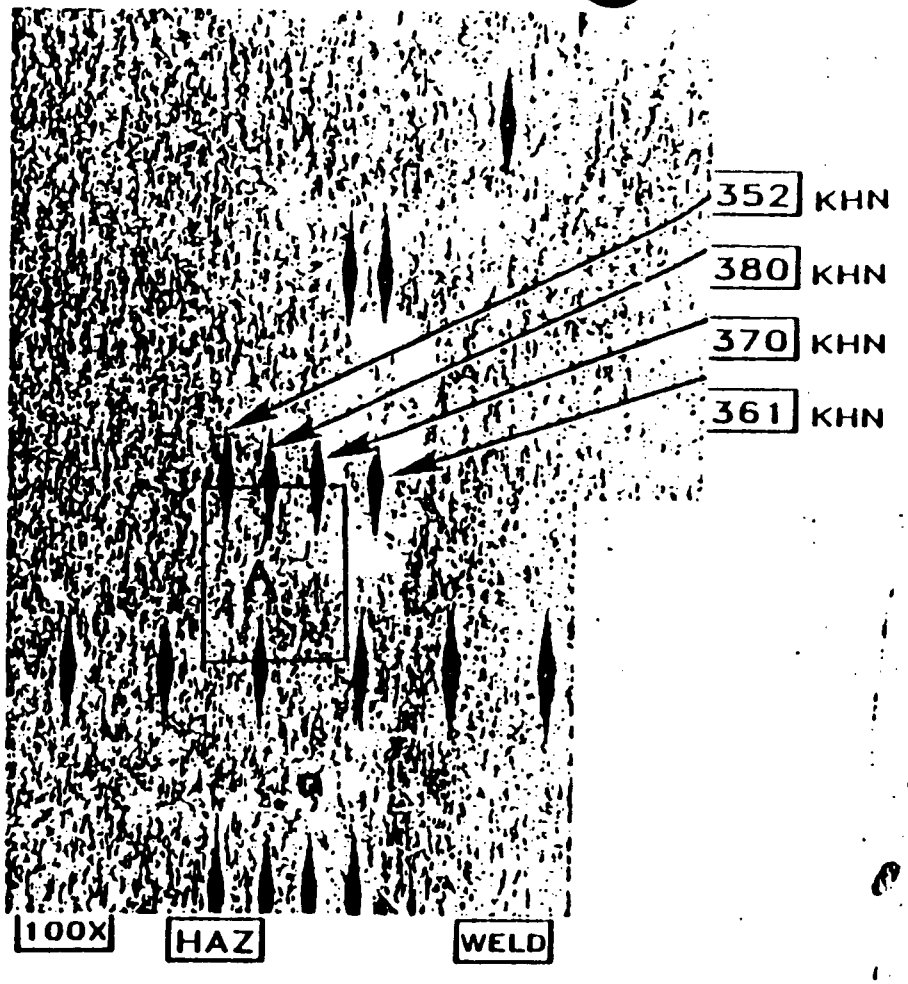
- CRACKING IN THE GIRTH WELD AND TRANSITION CONE IS CAUSED BY 'CORROSION FATIGUE' AND/OR 'STRESS CORROSION' DEPENDING ON THE LOADS, ENVIRONMENT AND LOCATION
- CRACKING IN THE NOZZLE BORE IS CAUSED BY 'CORROSION FATIGUE' MECHANISM
- CRACK INITIATION IS CONTROLLED BY SURFACE PITTING
- PITTING IS CAUSED BY THE PRESENCE OF OXYGEN, COPPER AND STRESS (RESIDUAL OR APPLIED)
- NO MECHANICAL PROPERTY DEGRADATION IS SEEN FROM SERVICE AGING

# MECHANICAL PROPERTY MEASUREMENTS

- STEAM GENERATOR GIRTHWELD MATERIAL
- FEEDRING SUPPORTS (SHELF)

# MECHANICAL PROPERTY MEASUREMENTS

- HARDNESS MEASUREMENTS
- TENSILE PROPERTY
- CHARPY IMPACT TOUGHNESS
- FATIGUE ENDURANCE



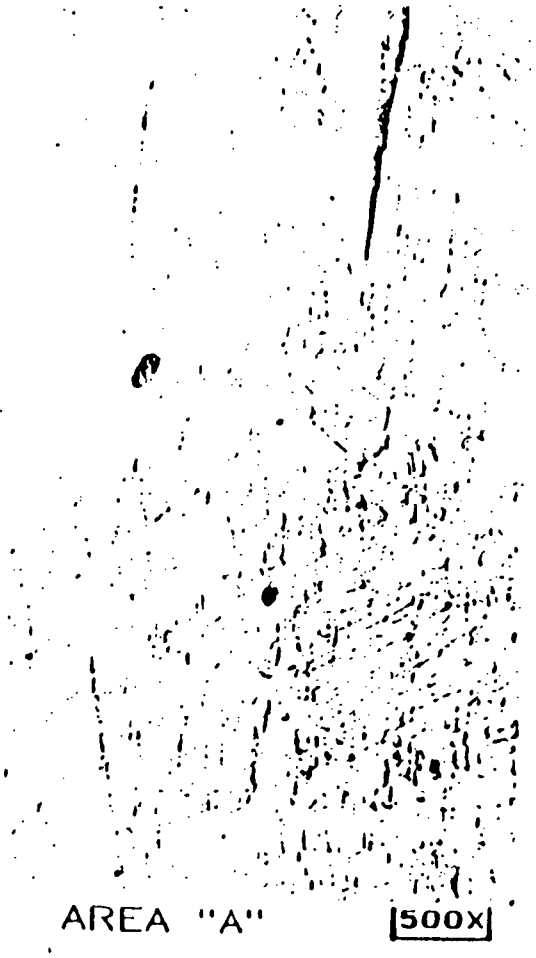




**Figure 3.6**
**Optical Metallography Results of the Boat Sample Illustrating the Details of the "High Hardness Zone" Microstructure and Knoop Hardness Values Associated with the Second Weld Pass**

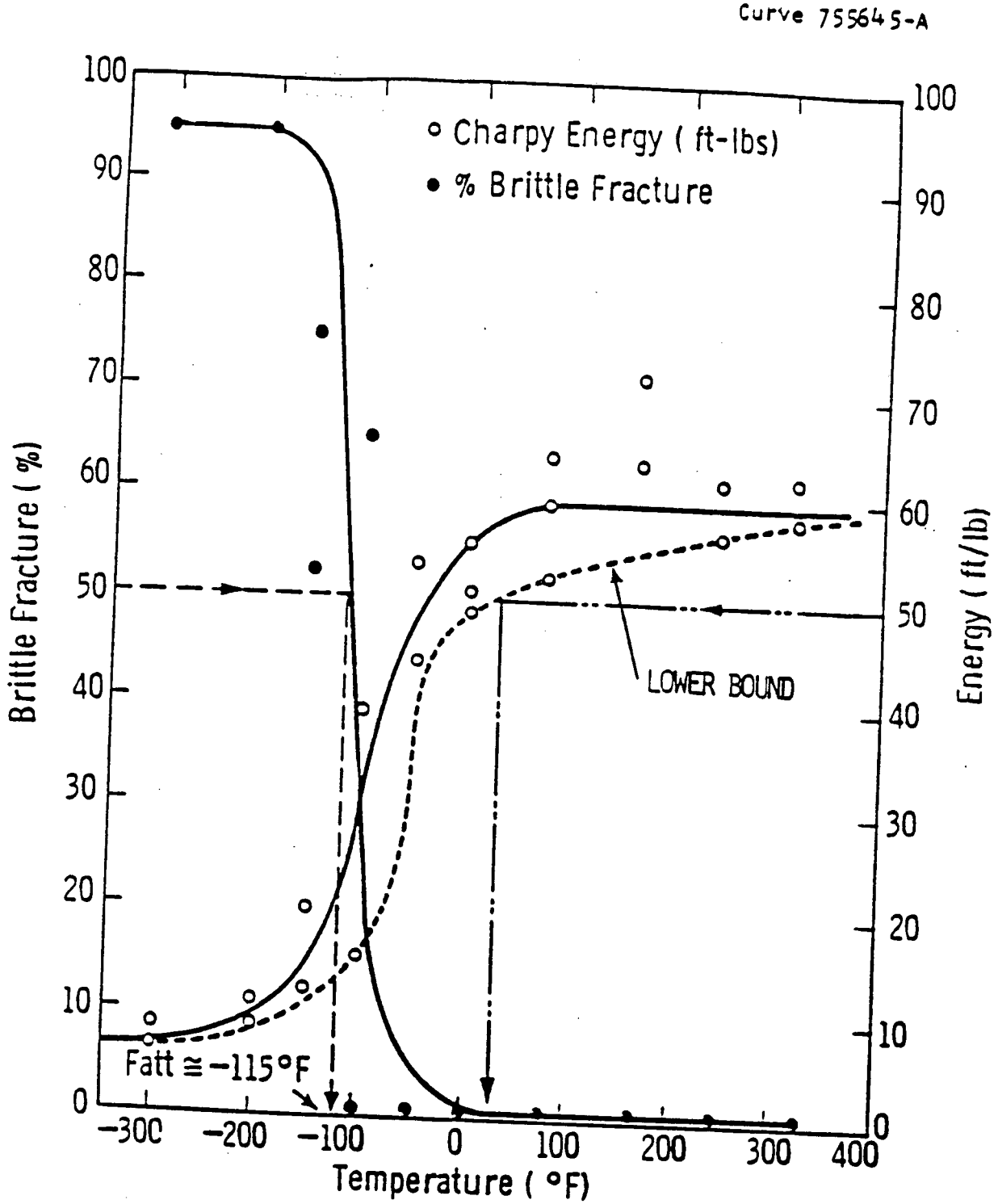



Figure 3.53 Charpy Impact Test Results of the Gleeble Simulated HAZ High Hardness Zone in SA302 Grade B Steel

# MECHANICAL PROPERTY TEST RESULTS
# FEEDRING SUPPORT SHELF MATERIAL SG21

## 1. TENSILE TESTS

| | 0.2% YIELD STRENGTH (KSI) | TENSILE STRENGTH (KSI) | TOTAL ELONGATION (%) | REDUCTION IN AREA (%) |
|---|---|---|---|---|
| SHELF MATERIAL | 47.35 | 70.39 | 28.6 | 63.6 |
| ASTM A 516 GR 70 MAT'L. | 38 | 70-90 | 21 | - |

## 2. CHARPY TOUGHNESS TESTS

UPPER SHELF: 98.5 FT LBS AT 50° F

FATT : 25°F

## 3. FATIGUE TESTS

ENDURENCE LIMIT: ~ 33 KSI ($10^7$ CYCLES)

CODE CURVE 13 KSI ($10^7$ CYCLES)

# CONCLUSIONS

- CRACKING IN THE GIRTH WELD AND TRANSITION CONE IS CAUSED BY 'CORROSION FATIGUE' AND/OR 'STRESS CORROSION' DEPENDING ON THE LOADS, ENVIRONMENT AND LOCATION
- CRACKING IN THE NOZZLE BORE IS CAUSED BY 'CORROSION FATIGUE' MECHANISM
- CRACK INITIATION IS CONTROLLED BY SURFACE PITTING
- PITTING IS CAUSED BY THE PRESENCE OF OXYGEN, COPPER AND STRESS (RESIDUAL OR APPLIED)
- NO MECHANICAL PROPERTY DEGRADATION IS SEEN FROM SERVICE AGING

# MITIGATING MEASURES

## ACCOMPLISHED

1. MAIN FEEDWATER SHUTOFF DELAY - DURING REACTOR TRIP MINIMIZE THERMAL SHOCK OF GIRTH WELD

2. REMOVAL OF DOWNCOMER RESISTANCE PLATE - MINIMIZE DIRECT IMPINGEMENT ON GIRTH WELD AND POTENTIAL STRATIFICATION ACTION

## TO BE ACCOMPLISHED PRIOR TO RETURN TO SERVICE

NITROGEN BLANKET IN CONDENSATE STORAGE TANK - REDUCE OXYGEN INJECTION DURING STARTUP STANDBY AND SHUTDOWN

IMPROVE WET LAYUP PROGRAM TO MEET INDUSTRY GUIDELINES

# FUTURE PLANS

- PERFORM AN EXTENSIVE EXAMINATION OF THE GIRTH WELD AND OTHER AREAS DURING 1991 REFUELING OUTAGE.

- SOME CORRECTIVE ACTIONS MAY BE NECESSARY BASED ON ABOVE EXAMINATION:

  1. REPAIR TO PERMIT UNINTERUPTED OPERATION BETWEEN REFUELING OUTAGES.

  2. REPAIR TO INSURE COMPLIANCE WITH APPLICABLE CODES.

- CONDUCT CORROSION PRODUCT TRANSPORT DURING UPCOMING OPERATING PERIOD.

- REPLACE ONE CONDENSER WITH TITANIUM TUBING IN 1991.

- REPLACE REMAINING CONDENSERS WITH TITANIUM TUBING IN 1993.

- REPLACE REMAINING FEEDWATER HEATERS WITH STAINLESS STEEL TUBING IN 1993

- LONG TERM FUTURE ACTIONS:

  1. EVALUATE AND MONITOR CAUSAL MECHANISM AND ASSOCIATED CONSIDERATIONS AS CONTRASTED WITH STEAM GENERATOR REPLACEMENT.

  2. INITIATE PLANNING FOR FULL REACTOR COOLANT SYSTEM LOOP DECONTAMINATION.

ENCLOSURE 3

Westinghouse Electric Corporation

Energy Systems

Nuclear and Advanced Technology Division

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U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

May 21, 1990
NS-NRC-90-3513

Attention: Mr. Donald S. Brinkman
Senior Project Manager (IP2)
Project Directorate I-1
Division of Reactor Projects I/II

Subject: Indian Point Unit No. 2 Steam Generator Inspection, Repair, and Restoration Program Presentation Material

Dear Mr. Brinkman:

Enclosed is one copy of presentation materials entitled "Consolidated Edison/Westinghouse Steam Generator Inspection, Repair, and Restoration Program at Indian Point Unit 2" (Proprietary) which were used during the May 21, 1990 meeting at the NRC offices in Rockville, Maryland. This information provides a current description of the steam generator inspection, repair, and restoration program addressing related issues at Indian Point Unit No. 2.

The enclosed information contains information which is proprietary to Westinghouse Electric Corporation. Accordingly, we request that this information be withheld from public disclosure.

We will comply with the requirements of 10 CFR 2.790 to provide proprietary and non-proprietary versions of the above material together with an affidavit as soon as the proprietary information contained in the submittal has been specifically identified and the proprietary and non-proprietary versions have been prepared. We will submit the required number of copies of the proprietary and non-proprietary versions of the information and the required affidavit at that time.

In the meantime, we have provided a copy for your information and use. C. M. Holzle, Esq., of the NRC Office of the General Counsel, has advised Westinghouse that he concurs with this procedure.

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We expect to be able to fully comply with the requirements for the proprietary and non-proprietary versions of the information and an accompanying affidavit within four weeks.

WESTINGHOUSE ELECTRIC CORPORATION

for W. J. Johnson, Manager
Nuclear Safety Department

cc: C. M. Holzle, Esq., Office of the General Counsel, NRC

R. A. Wiesemann, Manager, Regulatory & Legislative Affairs
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