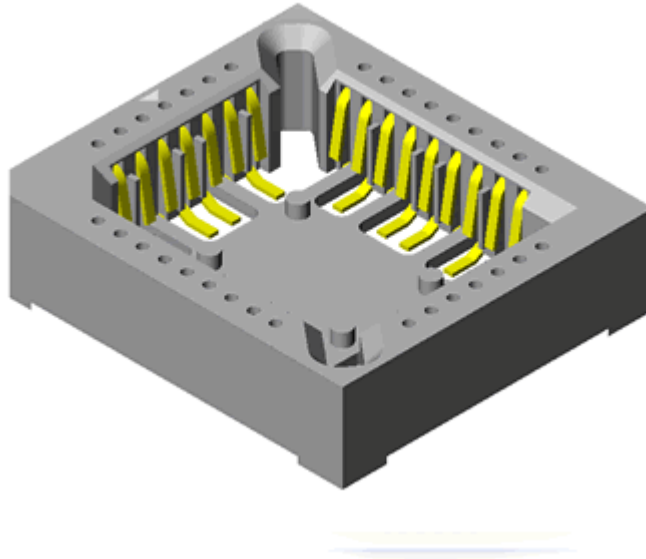




|                           |                           |                                |                                     |
|---------------------------|---------------------------|--------------------------------|-------------------------------------|
| Project Number: N/A       |                           | Tracking Code: TC0327-N/A-0228 |                                     |
| Requested by: Phil Eckert |                           | Date: 6/30/2003                | Product Rev: N/A                    |
| Part #: PLCC-044-T-A      |                           | Lot #: N/A                     | Tech: Troy Cook<br>Eng: John Tozier |
| Part description: PLCC    |                           |                                | Qty to test: 10                     |
| Test Start: 07/17/2003    | Test Completed: 8/21/2003 |                                |                                     |



**Satin-Tin contact comparison, soldered with and without a Nitrogen blanket**

**PART DESCRIPTION**

**PLCC-044-T-A  
Mated with  
PLCA-044-T-S-A**

## CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to ISO 10012-1 and ANSI/NCSL 2540-1, as applicable.

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### SCOPE

To evaluate Satin-Tin contact system integrity after exposure to typical Pb-free soldering processes. The evaluation will occur on systems soldered with and without the Nitrogen blanket.

### APPLICABLE DOCUMENTS

Standards: EIA Publication 364

### TEST SAMPLES AND PREPARATION

**The two mating components (if applicable) were soldered using AIM TSC-4 lead free alloy using Sn with 3.8%-4% Ag, and 0.5% - 0.7% Cu solder paste using the oven profile .**

- 1) All materials were manufactured in accordance with the applicable product specification.
- 2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
- 3) After soldering, the parts were cleaned with the Aqueous Inline Cleaning System (Aqueous Millennium Technologies)

**FLOWCHART**

| <b>TEST STEP</b> | <b>GROUP A<br/>200 Points<br/><br/>480 hour Test<br/>Processed in AIR</b> | <b>GROUP B<br/>200 Points<br/><br/>480 hour Test<br/>Processed in<br/>Nitrogen</b> |
|------------------|---|--|
| <b>01</b>        | LLCR-1  | LLCR-1   |
| <b>02</b>        | Data Review   | Data Review  |
| <b>03</b>        | Cyclic Humidity,<br>240 Hours   | Cyclic Humidity,<br>240 Hours  |
| <b>04</b>        | LLCR-2  | LLCR-2   |
| <b>05</b>        | Data Review   | Data Review  |
| <b>06</b>        | Cyclic Humidity,<br>240 Hours   | Cyclic Humidity,<br>240 Hours  |
| <b>07</b>        | LLCR-3  | LLCR-3   |

**Humidity =EIA-364-31, Test Condition B (240 Hours)  
and Method III (+25 ° C to +65 ° C @ 90%RH to 98% RH)  
delete steps 7a and 7b**

**LLCR = EIA-364-23, LLCR  
use Keithley 580 in the dry circuit mode, 10 mA Max**



**ATTRIBUTE DEFINITION**

Following is a brief, simplified description of attributes.

**CYCLIC HUMIDITY:**

- 1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors*.
  - a) Test Condition B, 240 Hours.
  - b) Method III, +25° C to + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
- 2) Connectors are mated.
- 3) Test Condition B run twice for a total of 480 hours.
  - a) Intermediate results taken at 240 hours.

**LLCR:**

- 1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
  - a)  $\leq +5.0$  mOhms: ----- Stable
  - b)  $+5.1$  to  $+10.0$  mOhms:----- Minor
  - c)  $+10.1$  to  $+15.0$  mOhms: ----- Acceptable
  - d)  $+15.1$  to  $+50.0$  mOhms: ----- Marginal
  - e)  $+50.1$  to  $+2000$  mOhms: ----- Unstable
  - f)  $>+2000$  mOhms:----- Open Failure

**RESULTS****LLCR (200 LLCR test points)**

- **Initial**
  - Air Processed ----- 14.4 mOhms Max
  - Nitrogen Processed----- 15.0 mOhms Max
- **Stressed 240 Hours**
  - <= +5.0 mOhms
    - Air Processed-----200 Points ----- Stable
    - Nitrogen Processed-----198 Points ----- Stable
  - +5.1 to +10.0 mOhms
    - Air Processed-----0 Points ----- Minor
    - Nitrogen Processed-----2 Points ----- Minor
  - +10.1 to +15.0 mOhms
    - Air Processed-----0 Points ----- Acceptable
    - Nitrogen Processed-----0 Points ----- Acceptable
  - +15.1 to +50.0 mOhms
    - Air Processed-----0 Points ----- Marginal
    - Nitrogen Processed-----0 Points ----- Marginal
  - +50.1 to +2000 mOhms
    - Air Processed-----0 Points ----- Unstable
    - Nitrogen Processed-----0 Points ----- Unstable
  - >+2000 mOhms
    - Air Processed-----0 Points ----- Open Failure
    - Nitrogen Processed-----0 Points ----- Open Failure
- **Stressed 480 Hours**
  - <= +5.0 mOhms
    - Air Processed-----200 Points ----- Stable
    - Nitrogen Processed-----198 Points ----- Stable
  - +5.1 to +10.0 mOhms
    - Air Processed-----0 Points ----- Minor
    - Nitrogen Processed-----2 Points ----- Minor
  - +10.1 to +15.0 mOhms
    - Air Processed-----0 Points ----- Acceptable
    - Nitrogen Processed-----0 Points ----- Acceptable
  - +15.1 to +50.0 mOhms
    - Air Processed-----0 Points ----- Marginal
    - Nitrogen Processed-----0 Points ----- Marginal
  - +50.1 to +2000 mOhms
    - Air Processed-----0 Points ----- Unstable
    - Nitrogen Processed-----0 Points ----- Unstable
  - >+2000 mOhms
    - Air Processed-----0 Points ----- Open Failure
    - Nitrogen Processed-----0 Points ----- Open Failure

After soldering, parts soldered in the 'open air process' showed slight discoloration compared to those parts soldered in the 'nitrogen blanket process'. Discoloration is seen as a slight 'yellowing' or 'bronzing'.

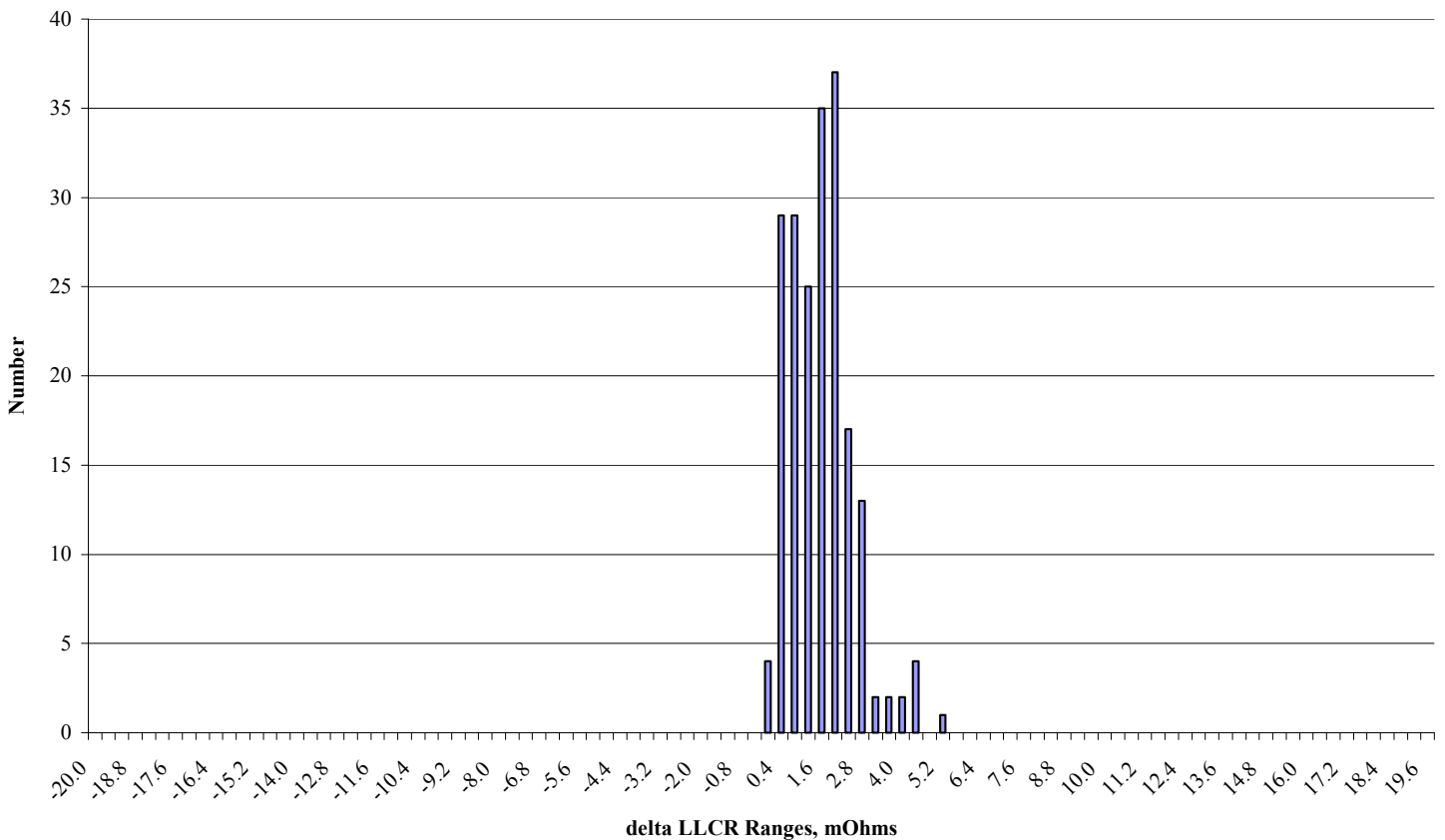
**DATA SUMMARIES**

**LLCR:**

- 1) A total of 200 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
  - a)  $\leq +5.0$  mOhms: ----- Stable
  - b)  $+5.1$  to  $+10.0$  mOhms:----- Minor
  - c)  $+10.1$  to  $+15.0$  mOhms: ----- Acceptable
  - d)  $+15.1$  to  $+50.0$  mOhms: ----- Marginal
  - e)  $+50.1$  to  $+2000$  mOhms ----- Unstable
  - f)  $>+2000$  mOhms:----- Open Failure

| mOhm values | Air Processed  |                          |                          |
|-------------|----------------|--------------------------|--------------------------|
|             | Actual Initial | Delta Humidity-240 Hours | Delta Humidity-480 Hours |
| Average     | 11.2           | 0.7                      | 1.4                      |
| St. Dev.    | 1.2            | 0.6                      | 0.9                      |
| Min         | 9.4            | -0.2                     | -0.3                     |
| Max         | 14.4           | 2.5                      | 4.9                      |
| Count       | 200            | 200                      | 200                      |

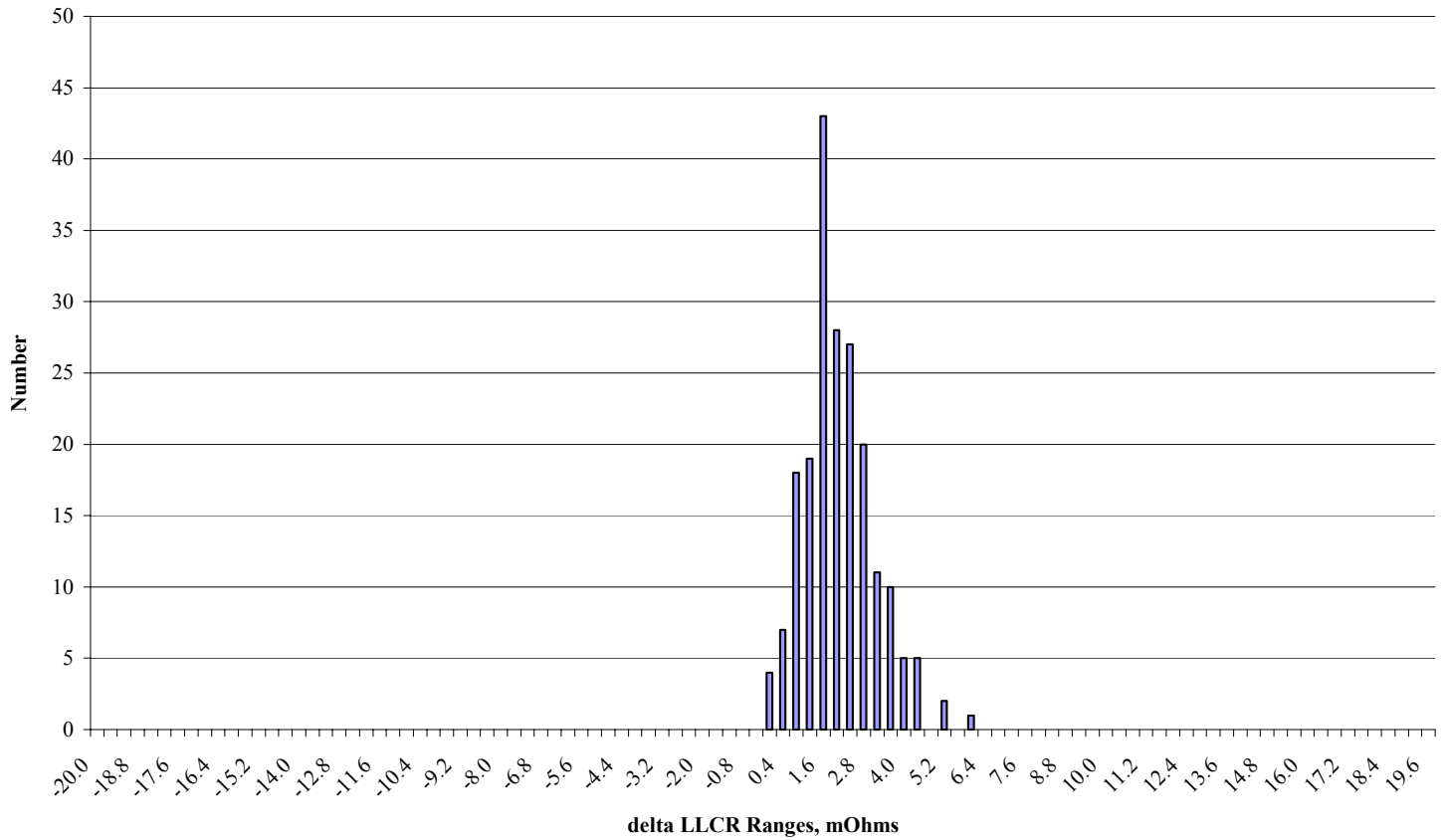
**Air Processed  
After 480 Hours**



**DATA SUMMARIES Continued**

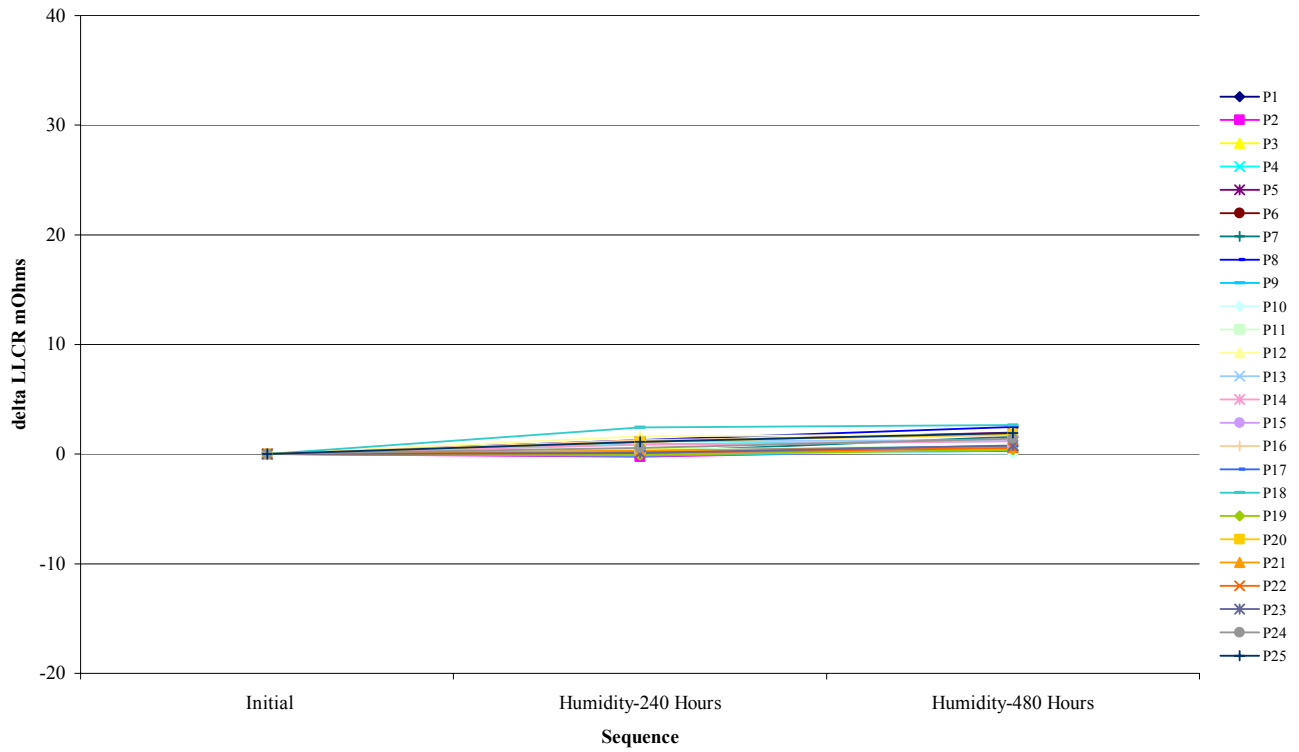
| mOhm values | Nitrogen Processed |                          |                          |
|-------------|--------------------|--------------------------|--------------------------|
|             | Actual Initial     | Delta Humidity-240 Hours | Delta Humidity-480 Hours |
| Average     | 11.5               | 1.3                      | 1.9                      |
| St. Dev.    | 1.2                | 1.0                      | 1.0                      |
| Min         | 9.6                | -0.3                     | -0.3                     |
| Max         | 15.0               | 5.7                      | 5.6                      |
| Count       | 200                | 200                      | 200                      |

**Nitrogen Processed  
After 480 Hours**

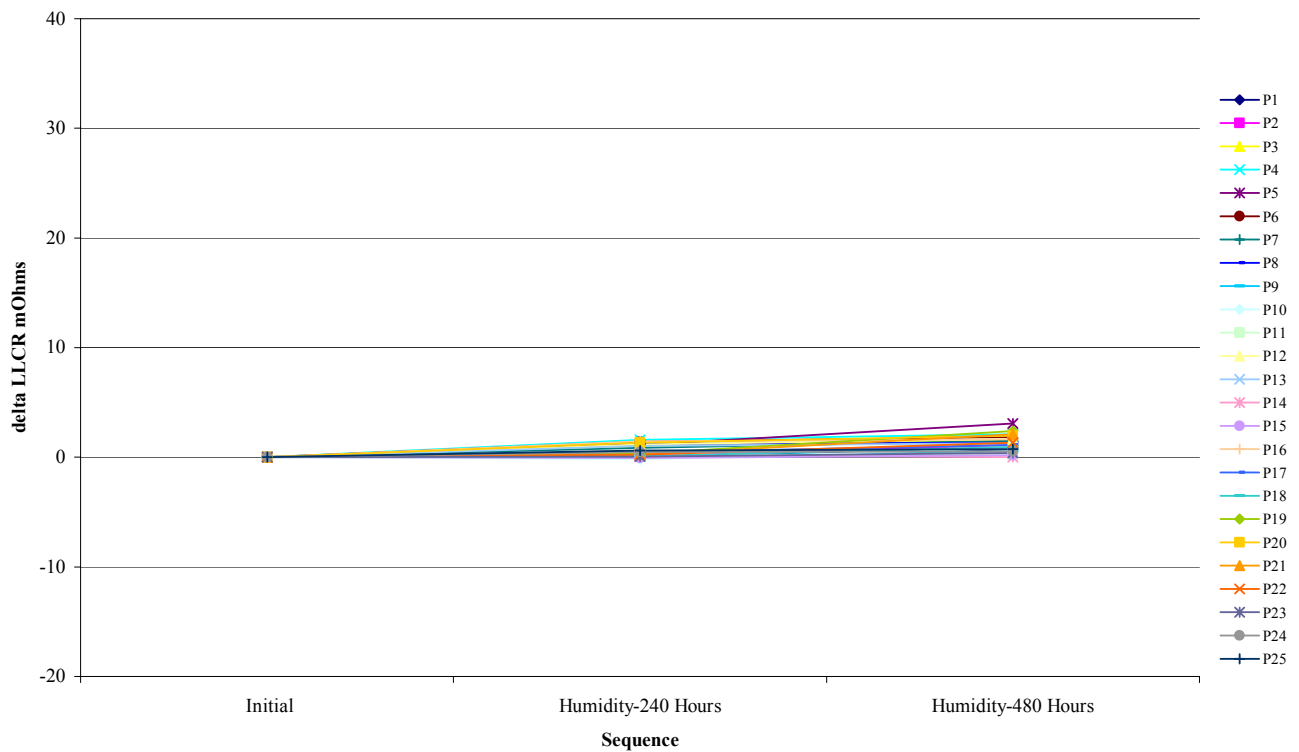


### DATA SUMMARIES Continued

Air Processed  
Board #1

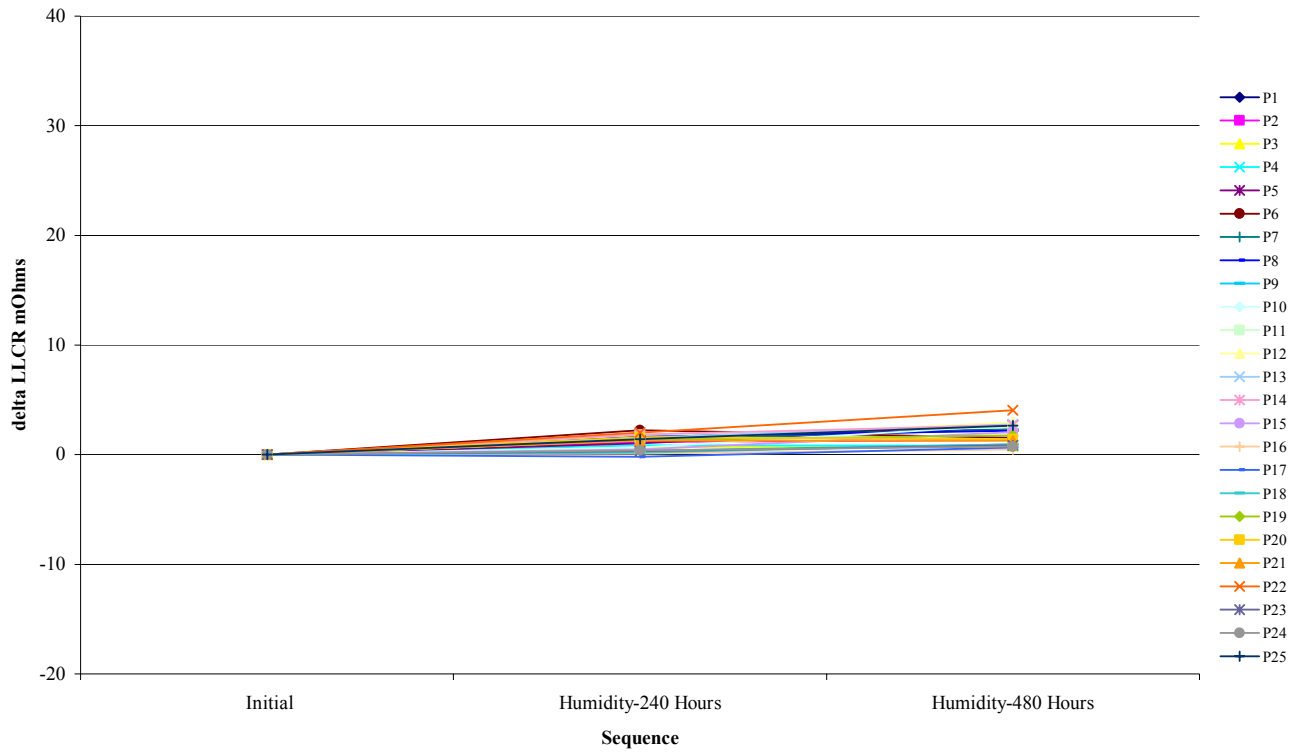


Air Processed  
Board #2

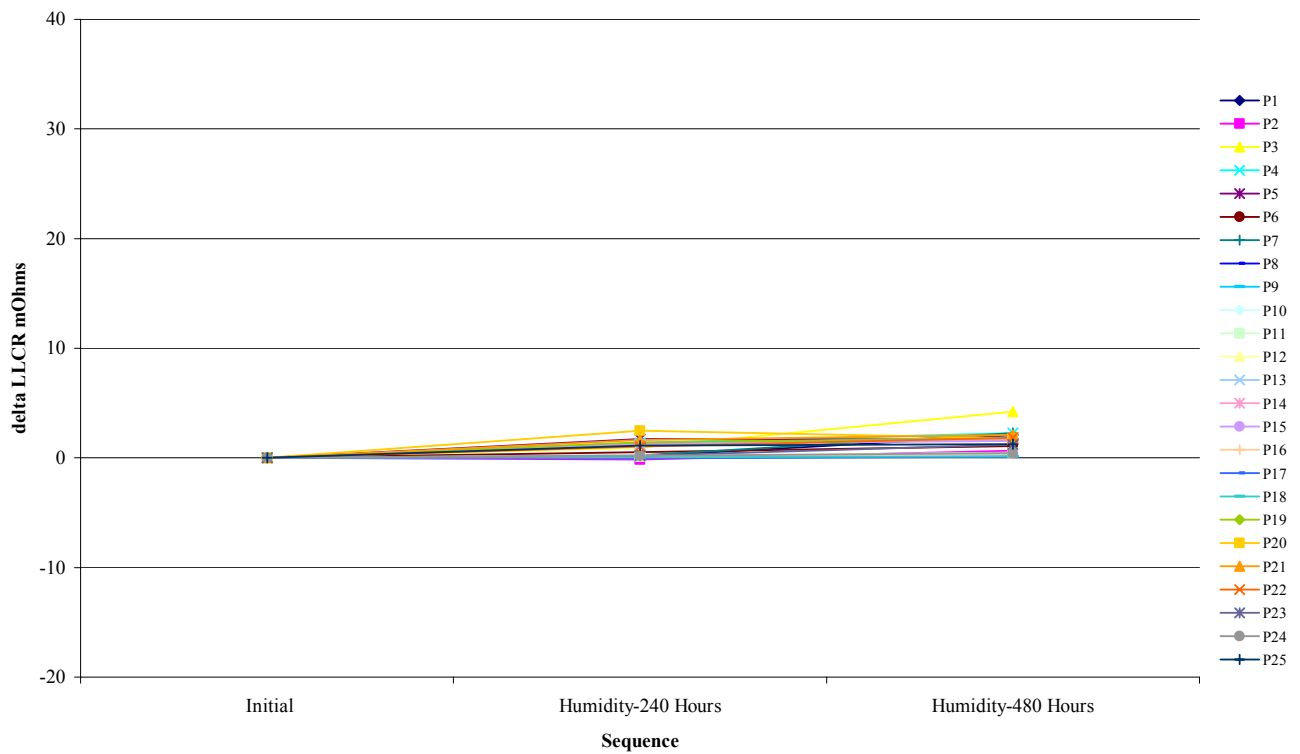


### DATA SUMMARIES Continued

Air Processed  
Board #3

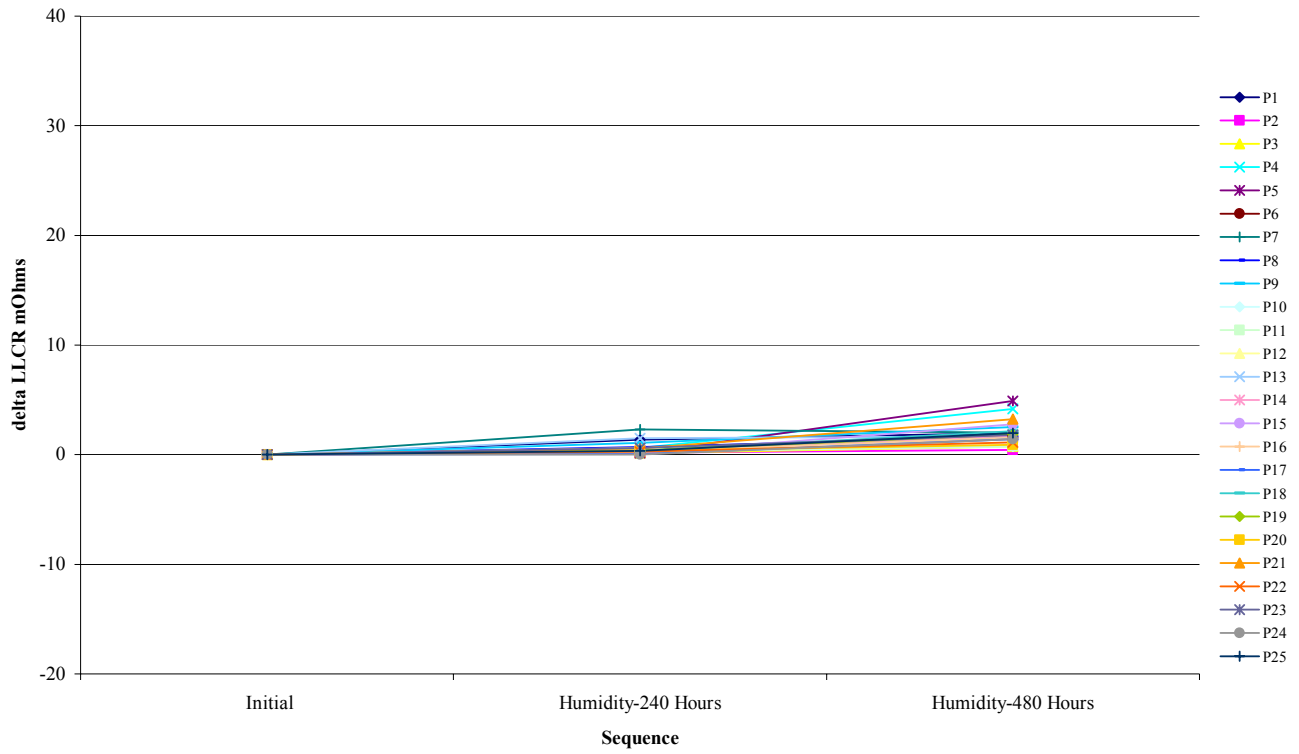


Air Processed  
Board #4

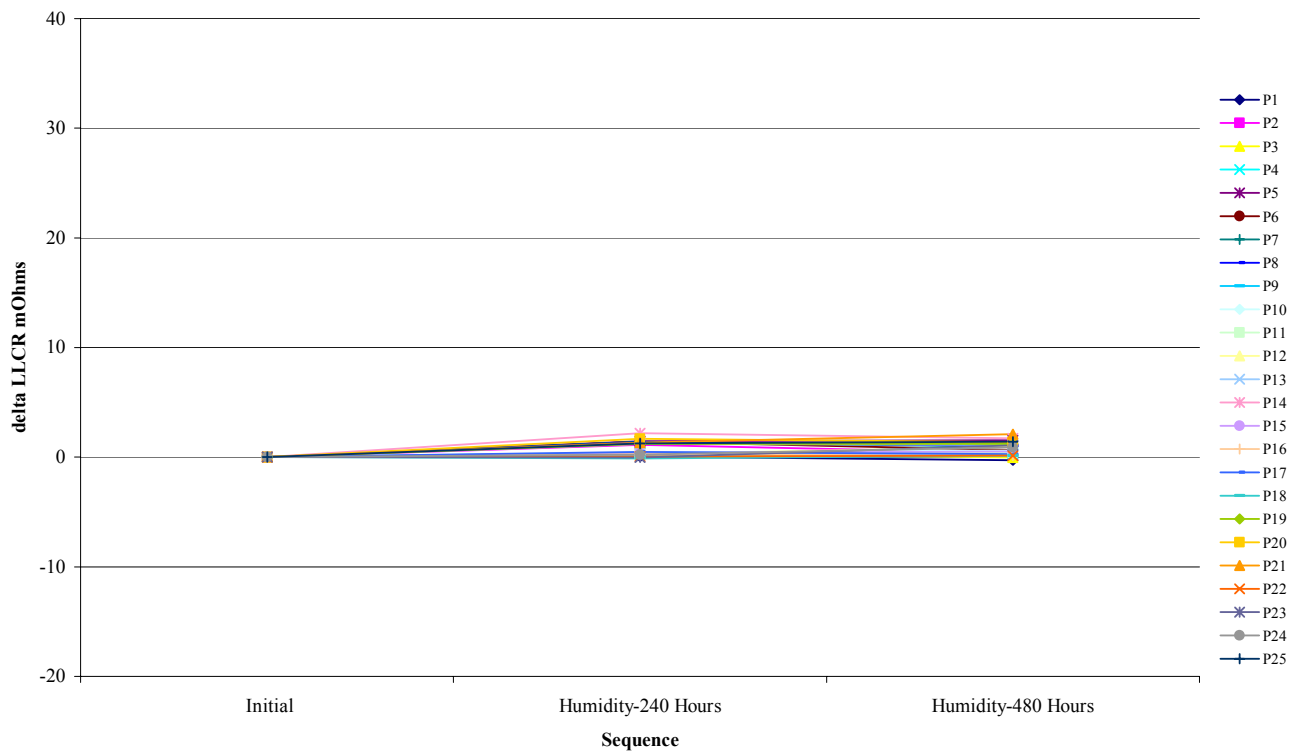


### DATA SUMMARIES Continued

Air Processed  
Board #5

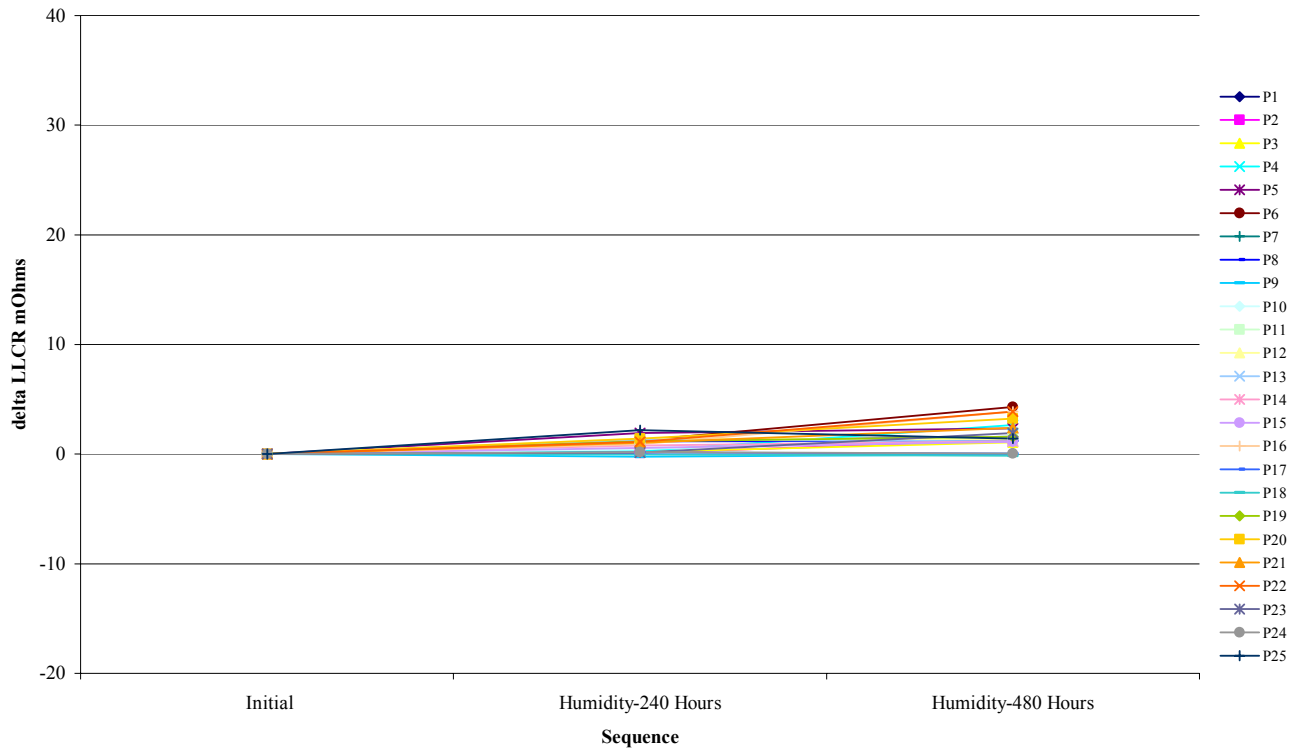


Air Processed  
Board #6

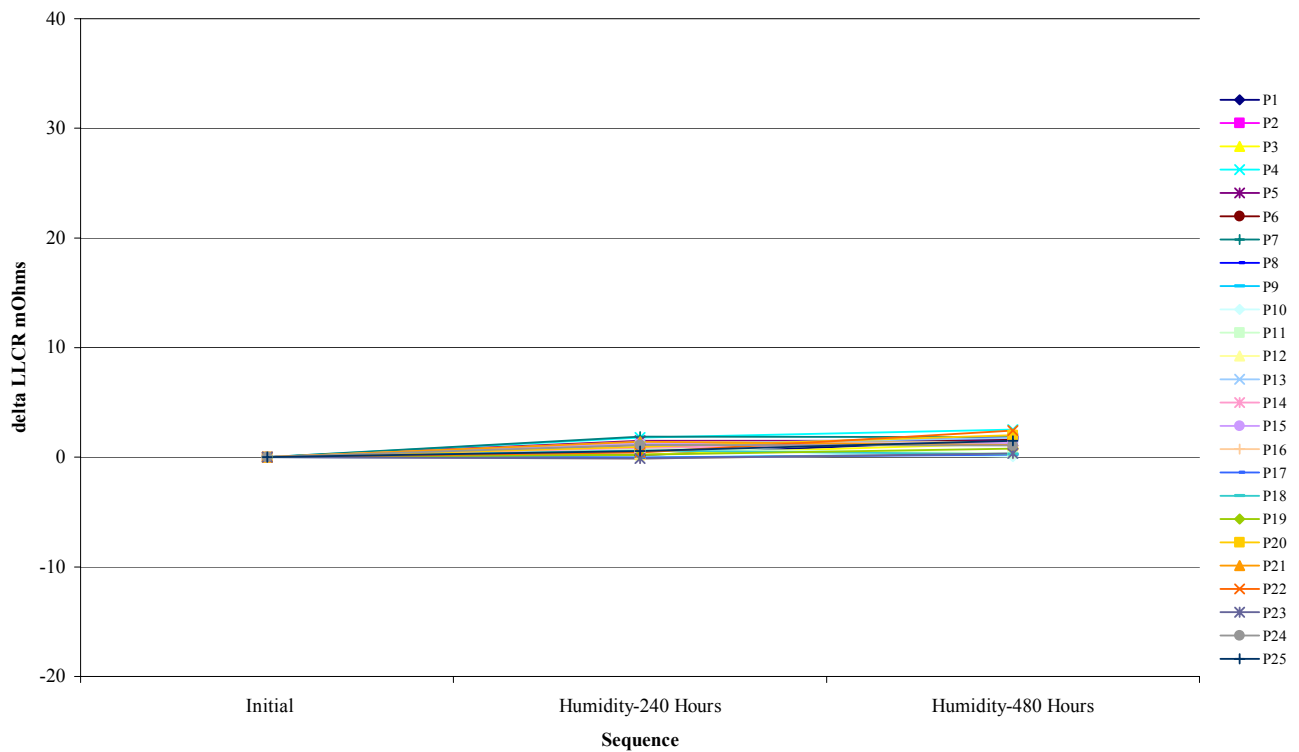


### DATA SUMMARIES Continued

Air Processed  
Board #7

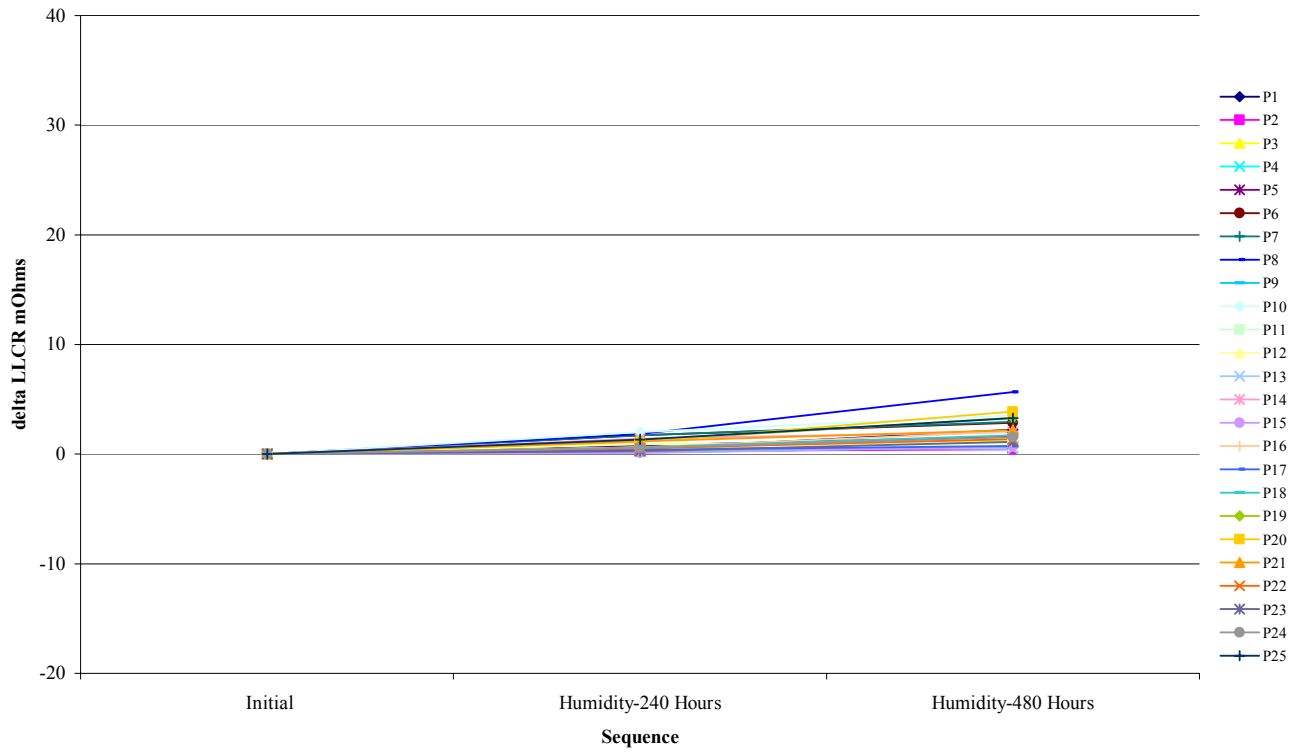


Air Processed  
Board #8



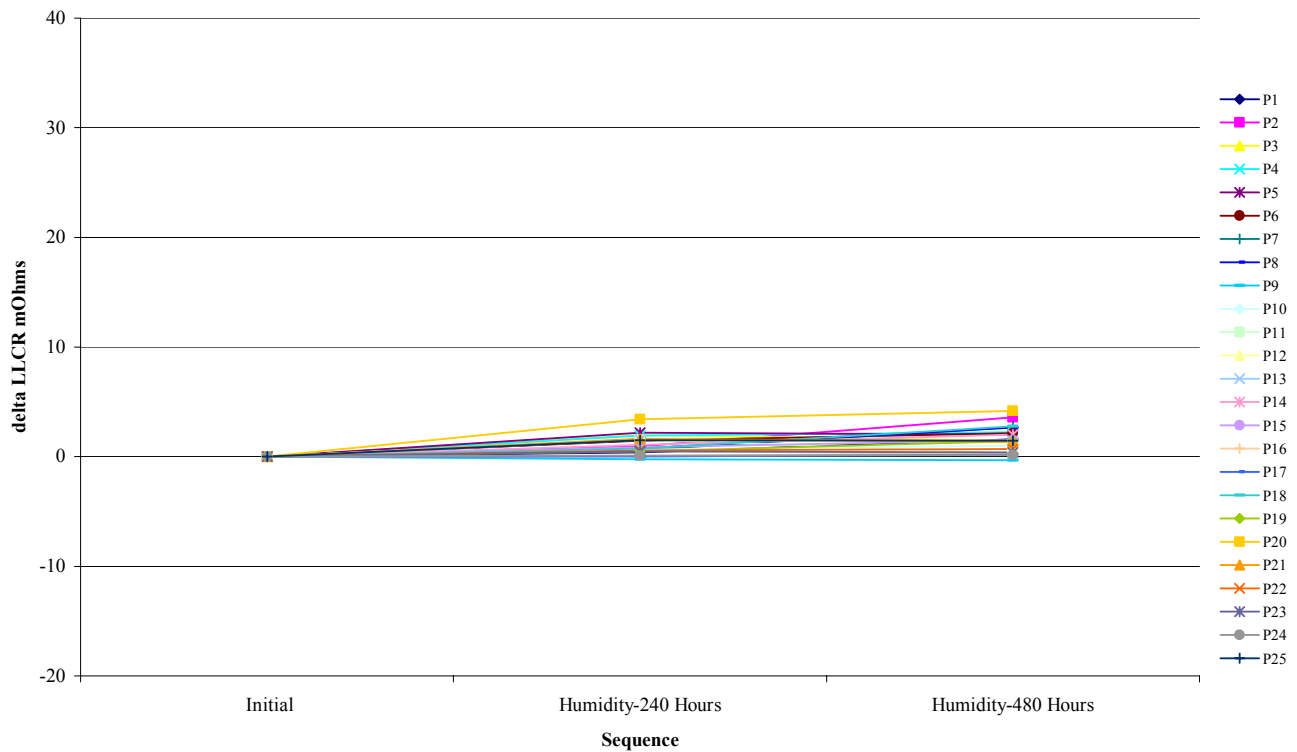
### DATA SUMMARIES Continued

Nitrogen Processed  
Board #1



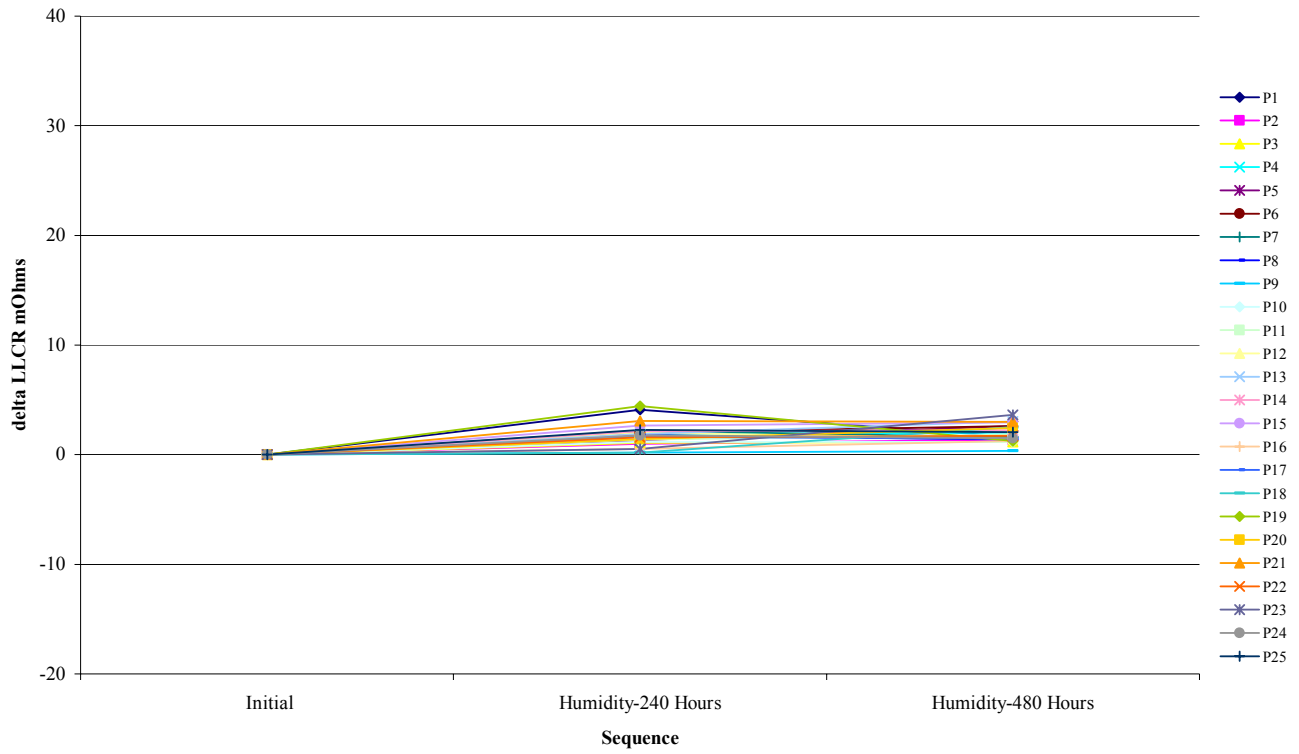
### Nitrogen Processed

Board #2

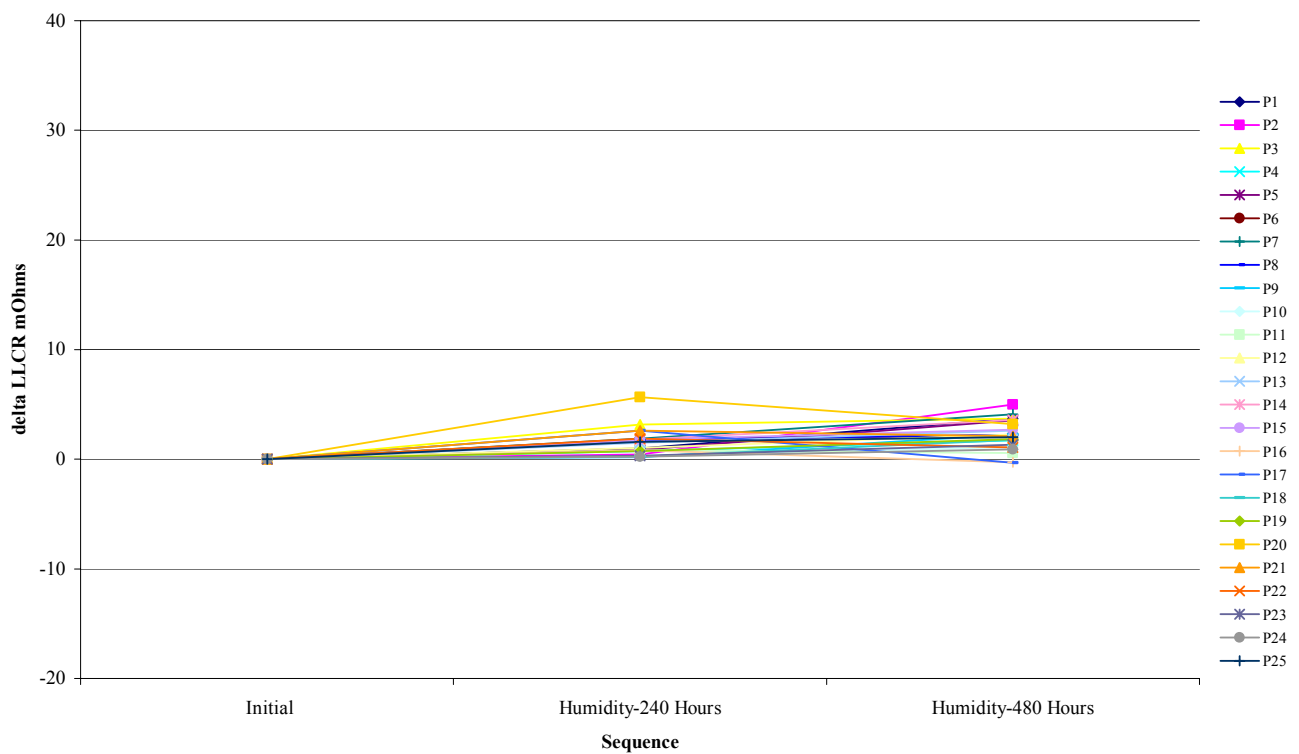


### DATA SUMMARIES Continued

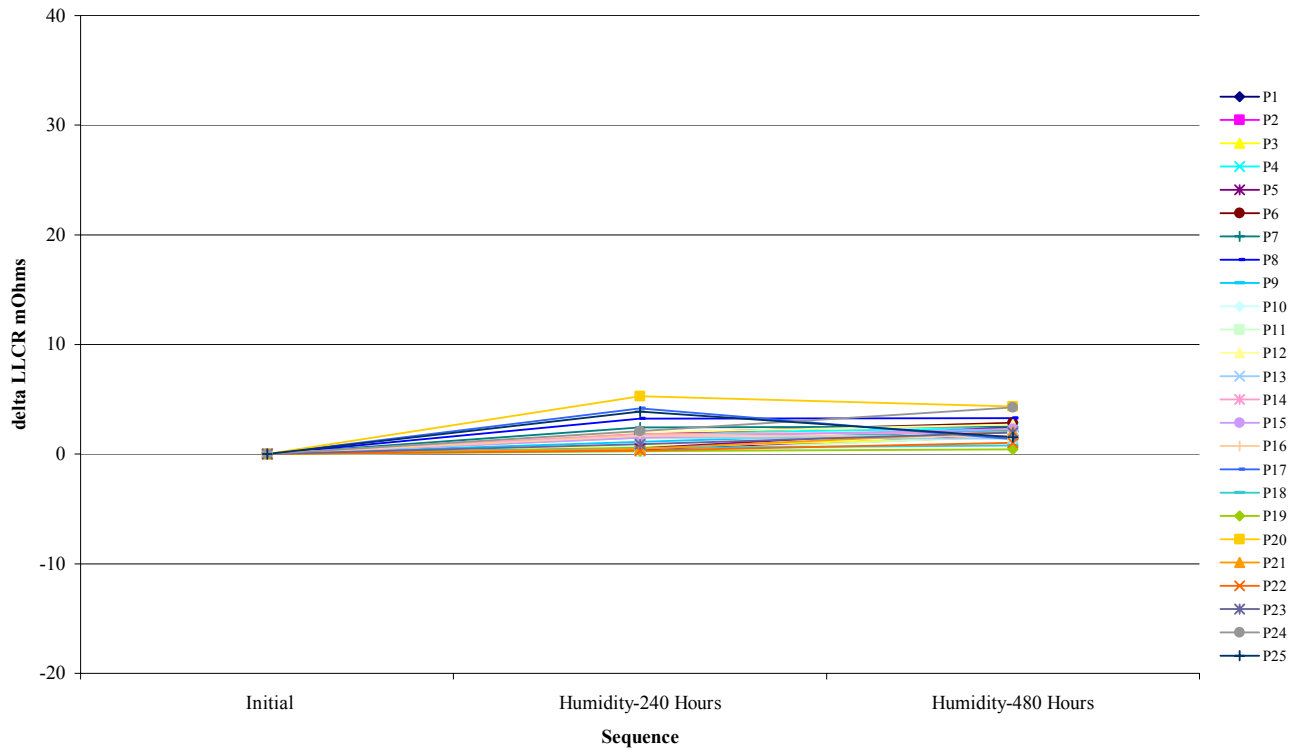
Nitrogen Processed  
Board #3



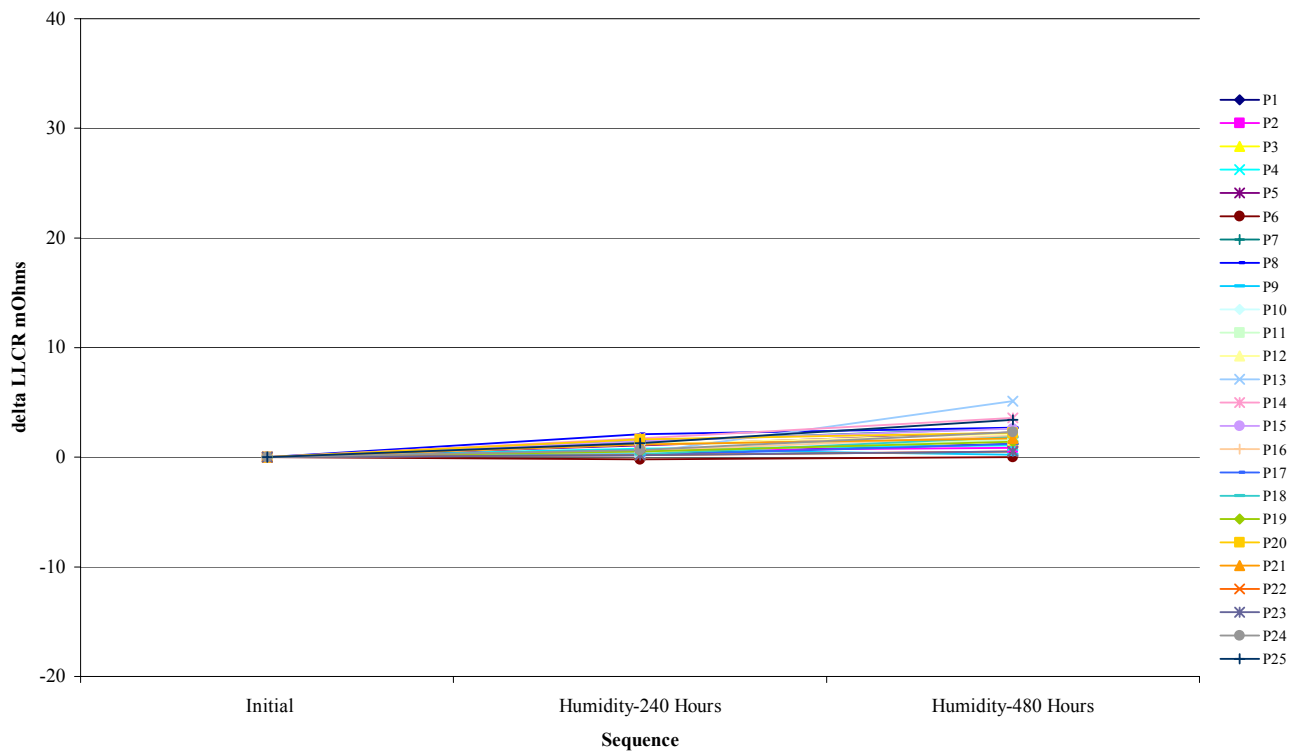
### Nitrogen Processed Board #4



**DATA SUMMARIES Continued**  
**Nitrogen Processed**  
**Board #5**

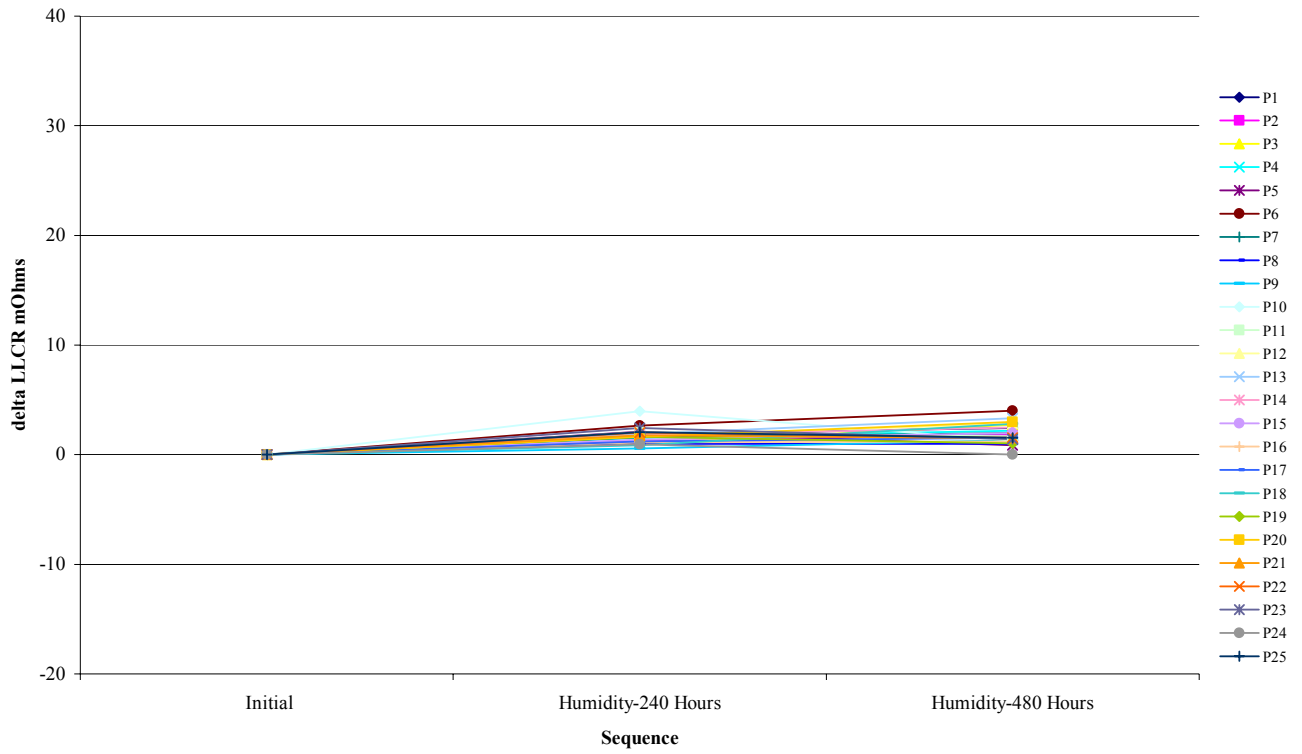


**Nitrogen Processed**  
**Board #6**



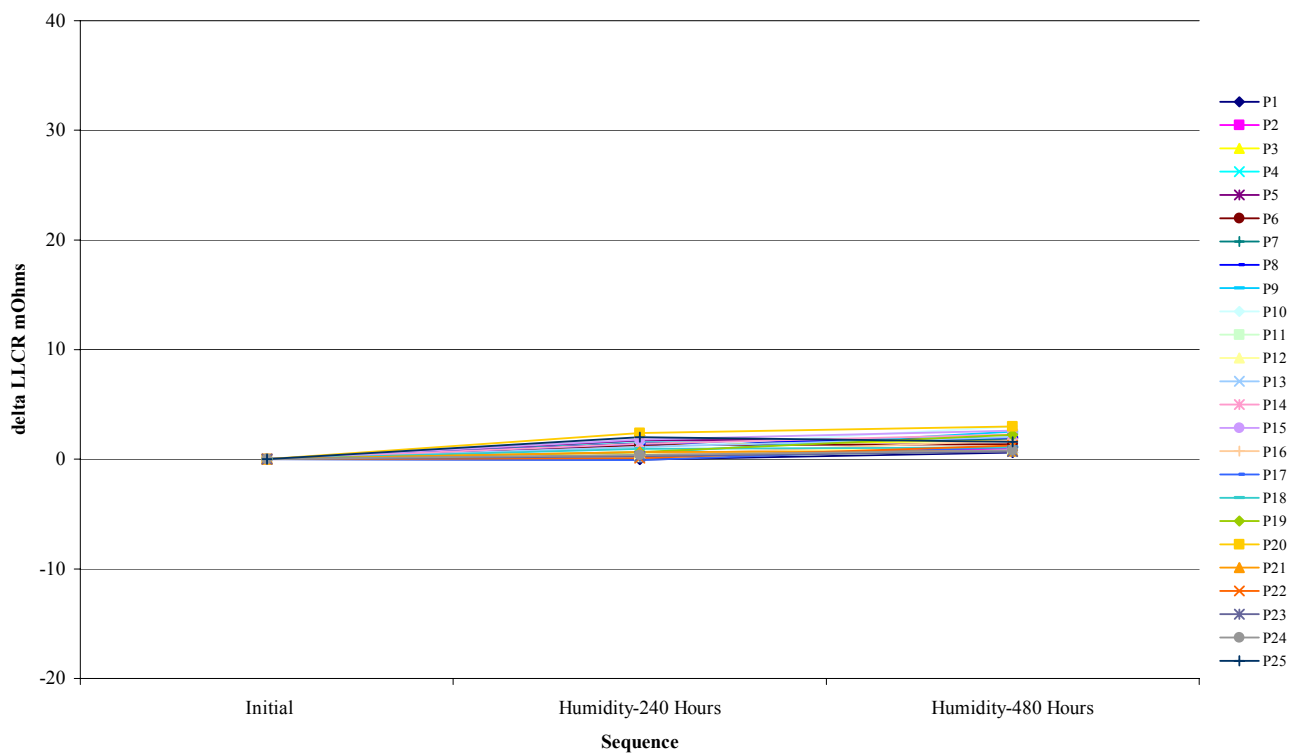
### DATA SUMMARIES Continued

Nitrogen Processed  
Board #7



### Nitrogen Processed

Board #8



**DATA****LLCR, Air Processed:**

|             |                 |                 |                 |
|-------------|-----------------|-----------------|-----------------|
| Date        | Jul. 17<br>2003 | Aug. 05<br>2003 | Aug. 20<br>2003 |
| Room Temp C | 20              | 22              | 21              |
| RH          | 49%             | 52%             | 49%             |
| Initials    | Troy Cook       | Troy Cook       | Troy Cook       |

| mOhm<br>values |          | Actual  | Delta                  | Delta                  |
|----------------|----------|---------|------------------------|------------------------|
| Board          | Position | Initial | Humidity-<br>240 Hours | Humidity-<br>480 Hours |
| 1              | P1       | 13.1    | -0.1                   | 0.3                    |
| 1              | P2       | 13.3    | -0.2                   | 0.4                    |
| 1              | P3       | 11.5    | 0.5                    | 0.5                    |
| 1              | P4       | 11.4    | 0.9                    | 1.2                    |
| 1              | P5       | 11.0    | 1.1                    | 2.0                    |
| 1              | P6       | 10.9    | 0.1                    | 0.6                    |
| 1              | P7       | 12.8    | 0.2                    | 1.6                    |
| 1              | P8       | 13.2    | 1.3                    | 2.5                    |
| 1              | P9       | 13.3    | -0.1                   | 0.3                    |
| 1              | P10      | 11.5    | 0.1                    | 0.1                    |
| 1              | P11      | 10.6    | 0.4                    | 0.8                    |
| 1              | P12      | 10.7    | 1.6                    | 1.8                    |
| 1              | P13      | 10.2    | 1.2                    | 1.3                    |
| 1              | P14      | 10.4    | 0.9                    | 1.2                    |
| 1              | P15      | 11.8    | 0.0                    | 0.6                    |
| 1              | P16      | 10.7    | 1.3                    | 1.7                    |
| 1              | P17      | 11.0    | 0.3                    | 0.7                    |
| 1              | P18      | 13.5    | 2.4                    | 2.7                    |
| 1              | P19      | 13.3    | -0.1                   | 0.4                    |
| 1              | P20      | 9.4     | 1.1                    | 1.8                    |
| 1              | P21      | 10.1    | 0.3                    | 0.6                    |
| 1              | P22      | 11.2    | 0.1                    | 0.6                    |
| 1              | P23      | 10.9    | 0.1                    | 0.8                    |
| 1              | P24      | 12.9    | 0.6                    | 1.4                    |
| 1              | P25      | 13.3    | 1.1                    | 1.9                    |
| 2              | P1       | 13.5    | 0.0                    | 0.8                    |
| 2              | P2       | 13.3    | 0.0                    | 1.1                    |
| 2              | P3       | 11.8    | 1.1                    | 1.5                    |
| 2              | P4       | 11.6    | 1.6                    | 2.1                    |
| 2              | P5       | 11.1    | 1.1                    | 3.1                    |
| 2              | P6       | 10.2    | 1.4                    | 1.8                    |
| 2              | P7       | 13.5    | 0.9                    | 1.5                    |
| 2              | P8       | 13.5    | 1.2                    | 1.3                    |
| 2              | P9       | 13.2    | 0.1                    | 0.5                    |
| 2              | P10      | 11.7    | -0.2                   | 0.8                    |
| 2              | P11      | 10.9    | 0.2                    | 0.2                    |

Tracking Code: TC0327-N/A-0228

Part #: PLCC-044-T-A

Part description: PLCC

|   |     |      |      |     |
|---|-----|------|------|-----|
| 2 | P12 | 10.9 | 1.2  | 1.7 |
| 2 | P13 | 10.4 | 1.0  | 1.3 |
| 2 | P14 | 11.4 | 0.2  | 0.0 |
| 2 | P15 | 12.5 | -0.1 | 0.2 |
| 2 | P16 | 11.0 | 1.4  | 1.6 |
| 2 | P17 | 11.5 | 0.5  | 1.1 |
| 2 | P18 | 12.9 | 0.1  | 0.9 |
| 2 | P19 | 12.8 | 0.3  | 2.4 |
| 2 | P20 | 10.1 | 1.3  | 2.0 |
| 2 | P21 | 10.6 | 0.2  | 2.1 |
| 2 | P22 | 11.5 | 0.2  | 1.3 |
| 2 | P23 | 11.6 | 0.0  | 0.4 |
| 2 | P24 | 13.1 | 0.5  | 0.5 |
| 2 | P25 | 14.4 | 0.6  | 0.7 |
| 3 | P1  | 12.0 | 1.7  | 2.4 |
| 3 | P2  | 11.5 | 1.1  | 1.4 |
| 3 | P3  | 10.4 | 0.6  | 0.8 |
| 3 | P4  | 10.1 | 0.9  | 0.8 |
| 3 | P5  | 9.7  | 1.0  | 2.7 |
| 3 | P6  | 9.4  | 2.2  | 1.5 |
| 3 | P7  | 12.4 | 1.4  | 2.3 |
| 3 | P8  | 12.1 | 1.6  | 2.2 |
| 3 | P9  | 11.9 | 0.3  | 0.9 |
| 3 | P10 | 10.7 | 0.7  | 2.7 |
| 3 | P11 | 10.6 | 1.8  | 2.5 |
| 3 | P12 | 10.1 | 1.3  | 3.0 |
| 3 | P13 | 10.1 | 1.5  | 2.8 |
| 3 | P14 | 9.9  | 1.9  | 2.7 |
| 3 | P15 | 10.4 | 0.5  | 2.0 |
| 3 | P16 | 10.9 | 0.1  | 0.5 |
| 3 | P17 | 11.6 | -0.2 | 0.7 |
| 3 | P18 | 12.9 | 0.2  | 0.9 |
| 3 | P19 | 13.0 | 1.3  | 1.7 |
| 3 | P20 | 9.6  | 1.6  | 1.4 |
| 3 | P21 | 10.3 | 1.3  | 1.3 |
| 3 | P22 | 10.6 | 2.0  | 4.0 |
| 3 | P23 | 10.3 | 0.3  | 0.8 |
| 3 | P24 | 11.9 | 0.4  | 0.8 |
| 3 | P25 | 12.6 | 1.4  | 2.7 |
| 4 | P1  | 11.5 | 0.1  | 2.0 |
| 4 | P2  | 11.7 | -0.2 | 0.7 |
| 4 | P3  | 10.1 | 1.0  | 4.2 |
| 4 | P4  | 10.6 | 1.4  | 2.3 |
| 4 | P5  | 9.8  | 1.7  | 1.7 |
| 4 | P6  | 10.1 | 0.5  | 1.1 |
| 4 | P7  | 11.8 | 0.2  | 2.3 |
| 4 | P8  | 12.0 | 1.3  | 1.7 |
| 4 | P9  | 11.6 | 0.0  | 0.2 |
| 4 | P10 | 10.3 | 0.2  | 0.4 |
| 4 | P11 | 9.8  | 0.1  | 0.5 |

Tracking Code: TC0327-N/A-0228

Part #: PLCC-044-T-A

Part description: PLCC

|   |     |      |     |      |
|---|-----|------|-----|------|
| 4 | P12 | 10.1 | 1.2 | 1.7  |
| 4 | P13 | 9.7  | 1.3 | 1.9  |
| 4 | P14 | 9.7  | 1.2 | 1.7  |
| 4 | P15 | 10.3 | 1.3 | 1.6  |
| 4 | P16 | 10.2 | 0.2 | 0.4  |
| 4 | P17 | 10.6 | 0.0 | 0.1  |
| 4 | P18 | 11.3 | 0.1 | 0.1  |
| 4 | P19 | 11.6 | 1.4 | 1.8  |
| 4 | P20 | 9.4  | 2.5 | 1.8  |
| 4 | P21 | 9.8  | 1.6 | 2.1  |
| 4 | P22 | 10.0 | 1.0 | 1.8  |
| 4 | P23 | 10.1 | 0.2 | 1.2  |
| 4 | P24 | 11.3 | 0.2 | 0.4  |
| 4 | P25 | 11.9 | 1.1 | 1.2  |
| 5 | P1  | 13.2 | 1.4 | 2.0  |
| 5 | P2  | 14.3 | 0.2 | 0.5  |
| 5 | P3  | 11.6 | 0.1 | 0.7  |
| 5 | P4  | 10.2 | 0.6 | 4.2  |
| 5 | P5  | 10.1 | 0.1 | 4.9  |
| 5 | P6  | 10.5 | 0.3 | 1.7  |
| 5 | P7  | 13.2 | 2.3 | 2.0  |
| 5 | P8  | 13.1 | 0.7 | 1.6  |
| 5 | P9  | 12.5 | 1.1 | 2.5  |
| 5 | P10 | 11.2 | 0.3 | 0.8  |
| 5 | P11 | 10.8 | 0.3 | 0.8  |
| 5 | P12 | 10.5 | 0.6 | 1.5  |
| 5 | P13 | 10.2 | 1.5 | 1.7  |
| 5 | P14 | 9.7  | 0.4 | 1.7  |
| 5 | P15 | 10.7 | 0.1 | 2.8  |
| 5 | P16 | 10.6 | 0.3 | 1.6  |
| 5 | P17 | 11.4 | 0.1 | 1.4  |
| 5 | P18 | 13.1 | 0.3 | 2.1  |
| 5 | P19 | 13.3 | 0.4 | 1.8  |
| 5 | P20 | 10.2 | 0.4 | 0.9  |
| 5 | P21 | 10.4 | 0.6 | 3.2  |
| 5 | P22 | 10.4 | 0.3 | 1.1  |
| 5 | P23 | 11.2 | 0.6 | 1.8  |
| 5 | P24 | 12.7 | 0.0 | 1.4  |
| 5 | P25 | 13.0 | 0.4 | 2.0  |
| 6 | P1  | 12.7 | 0.0 | -0.3 |
| 6 | P2  | 12.7 | 1.1 | 0.4  |
| 6 | P3  | 10.8 | 0.3 | 0.0  |
| 6 | P4  | 10.7 | 0.4 | 0.3  |
| 6 | P5  | 10.2 | 1.5 | 1.5  |
| 6 | P6  | 9.7  | 1.4 | 0.6  |
| 6 | P7  | 12.7 | 1.4 | 0.9  |
| 6 | P8  | 12.5 | 1.4 | 1.0  |
| 6 | P9  | 12.2 | 0.0 | 0.1  |
| 6 | P10 | 10.6 | 0.4 | 0.6  |
| 6 | P11 | 10.4 | 0.3 | 0.4  |

Tracking Code: TC0327-N/A-0228

Part #: PLCC-044-T-A

Part description: PLCC

|   |     |      |      |      |
|---|-----|------|------|------|
| 6 | P12 | 10.4 | 0.3  | 1.0  |
| 6 | P13 | 10.1 | 1.2  | 1.1  |
| 6 | P14 | 9.7  | 2.2  | 1.7  |
| 6 | P15 | 10.4 | 0.4  | 0.5  |
| 6 | P16 | 10.3 | 0.3  | 0.1  |
| 6 | P17 | 10.8 | 0.5  | 0.3  |
| 6 | P18 | 12.2 | -0.1 | 0.1  |
| 6 | P19 | 12.4 | 1.2  | 1.2  |
| 6 | P20 | 9.8  | 1.7  | 1.4  |
| 6 | P21 | 10.3 | 1.3  | 2.1  |
| 6 | P22 | 10.9 | 0.1  | 0.1  |
| 6 | P23 | 10.8 | 0.0  | 1.1  |
| 6 | P24 | 11.9 | 0.2  | 0.9  |
| 6 | P25 | 12.6 | 1.2  | 1.4  |
| 7 | P1  | 12.3 | 1.1  | 1.6  |
| 7 | P2  | 12.0 | 0.1  | 1.3  |
| 7 | P3  | 10.3 | 0.2  | 1.1  |
| 7 | P4  | 10.8 | 0.3  | 2.6  |
| 7 | P5  | 10.0 | 1.9  | 2.4  |
| 7 | P6  | 9.8  | 1.3  | 4.3  |
| 7 | P7  | 12.5 | 1.2  | 1.4  |
| 7 | P8  | 12.3 | 1.2  | 1.2  |
| 7 | P9  | 12.3 | -0.2 | 0.0  |
| 7 | P10 | 10.6 | 0.4  | 1.6  |
| 7 | P11 | 10.6 | 1.3  | 1.5  |
| 7 | P12 | 10.0 | 1.4  | 1.3  |
| 7 | P13 | 10.1 | 1.3  | 1.1  |
| 7 | P14 | 10.2 | 0.8  | 1.2  |
| 7 | P15 | 10.4 | 0.6  | 1.1  |
| 7 | P16 | 10.2 | 0.9  | 3.9  |
| 7 | P17 | 10.7 | 0.2  | 0.1  |
| 7 | P18 | 12.1 | 0.0  | -0.1 |
| 7 | P19 | 12.3 | 1.2  | 1.6  |
| 7 | P20 | 9.6  | 1.4  | 3.2  |
| 7 | P21 | 10.8 | 1.0  | 2.4  |
| 7 | P22 | 11.1 | 1.1  | 3.9  |
| 7 | P23 | 10.8 | 0.1  | 1.9  |
| 7 | P24 | 12.1 | 0.2  | 0.1  |
| 7 | P25 | 12.3 | 2.2  | 1.4  |
| 8 | P1  | 12.5 | 0.2  | 1.6  |
| 8 | P2  | 12.3 | 0.9  | 1.7  |
| 8 | P3  | 11.1 | 0.2  | 1.2  |
| 8 | P4  | 10.9 | 1.8  | 2.5  |
| 8 | P5  | 10.6 | 1.5  | 1.5  |
| 8 | P6  | 10.0 | 1.1  | 1.7  |
| 8 | P7  | 12.8 | 1.9  | 1.8  |
| 8 | P8  | 12.9 | 1.1  | 1.7  |
| 8 | P9  | 12.6 | 0.0  | 0.3  |
| 8 | P10 | 10.5 | 0.7  | 0.1  |
| 8 | P11 | 10.7 | 0.8  | 0.4  |

Tracking Code: TC0327-N/A-0228

Part #: PLCC-044-T-A

Part description: PLCC

|   |     |      |      |     |
|---|-----|------|------|-----|
| 8 | P12 | 10.3 | 1.4  | 1.4 |
| 8 | P13 | 10.4 | 1.2  | 1.7 |
| 8 | P14 | 10.4 | 0.9  | 1.4 |
| 8 | P15 | 10.4 | 1.2  | 1.3 |
| 8 | P16 | 10.6 | -0.1 | 0.3 |
| 8 | P17 | 10.4 | 0.0  | 0.2 |
| 8 | P18 | 11.2 | 0.6  | 0.3 |
| 8 | P19 | 11.1 | 0.2  | 0.8 |
| 8 | P20 | 9.4  | 0.9  | 2.0 |
| 8 | P21 | 10.1 | 1.4  | 1.1 |
| 8 | P22 | 9.9  | 0.4  | 2.4 |
| 8 | P23 | 10.6 | -0.1 | 0.4 |
| 8 | P24 | 11.3 | 1.1  | 1.1 |
| 8 | P25 | 11.3 | 0.6  | 1.5 |

**DATA Continued****LLCR, Nitrogen Processed:**

|             |                 |                 |                 |
|-------------|-----------------|-----------------|-----------------|
| Date        | Jul. 17<br>2003 | Aug. 05<br>2003 | Aug. 21<br>2003 |
| Room Temp C | 20              | 22              | 20              |
| RH          | 52%             | 52%             | 55%             |
| Initials    | Troy Cook       | Troy Cook       | Troy Cook       |

| mOhm values |          | Actual  | Delta                  | Delta                  |
|-------------|----------|---------|------------------------|------------------------|
| Board       | Position | Initial | Humidity-<br>240 Hours | Humidity-<br>480 Hours |
| 1           | P1       | 12.3    | 0.5                    | 2.2                    |
| 1           | P2       | 12.2    | 0.3                    | 0.4                    |
| 1           | P3       | 10.9    | 0.8                    | 1.3                    |
| 1           | P4       | 10.5    | 0.2                    | 0.7                    |
| 1           | P5       | 10.6    | 0.8                    | 1.6                    |
| 1           | P6       | 10.2    | 1.7                    | 2.8                    |
| 1           | P7       | 12.2    | 1.7                    | 2.9                    |
| 1           | P8       | 12.5    | 1.9                    | 5.6                    |
| 1           | P9       | 12.1    | 0.2                    | 0.7                    |
| 1           | P10      | 10.7    | 2.0                    | 3.6                    |
| 1           | P11      | 10.9    | 0.9                    | 1.0                    |
| 1           | P12      | 10.6    | 1.0                    | 0.8                    |
| 1           | P13      | 11.1    | 0.6                    | 0.5                    |
| 1           | P14      | 10.1    | 1.4                    | 2.0                    |
| 1           | P15      | 10.4    | 0.1                    | 0.7                    |
| 1           | P16      | 10.3    | 0.6                    | 2.1                    |
| 1           | P17      | 10.7    | 0.4                    | 0.7                    |
| 1           | P18      | 11.5    | 0.6                    | 1.7                    |
| 1           | P19      | 11.6    | 1.2                    | 3.3                    |
| 1           | P20      | 10.4    | 1.1                    | 3.9                    |
| 1           | P21      | 10.7    | 1.2                    | 2.2                    |
| 1           | P22      | 10.7    | 0.5                    | 1.4                    |
| 1           | P23      | 10.8    | 0.3                    | 1.1                    |
| 1           | P24      | 11.8    | 0.6                    | 1.6                    |
| 1           | P25      | 12.2    | 1.3                    | 3.3                    |
| 2           | P1       | 12.9    | 0.4                    | 1.6                    |
| 2           | P2       | 12.9    | 1.0                    | 3.6                    |
| 2           | P3       | 11.2    | 2.0                    | 1.5                    |
| 2           | P4       | 10.9    | 1.9                    | 2.2                    |
| 2           | P5       | 10.6    | 2.2                    | 2.0                    |
| 2           | P6       | 10.1    | 1.5                    | 2.2                    |
| 2           | P7       | 12.4    | 0.6                    | 2.7                    |
| 2           | P8       | 12.9    | 0.7                    | 2.7                    |
| 2           | P9       | 12.6    | -0.3                   | -0.3                   |
| 2           | P10      | 10.9    | 0.7                    | 1.0                    |
| 2           | P11      | 11.6    | 1.6                    | 0.3                    |

Tracking Code: TC0327-N/A-0228

Part #: PLCC-044-T-A

Part description: PLCC

|   |     |      |     |     |
|---|-----|------|-----|-----|
| 2 | P12 | 10.6 | 1.6 | 1.3 |
| 2 | P13 | 10.4 | 1.5 | 1.5 |
| 2 | P14 | 10.4 | 1.1 | 2.0 |
| 2 | P15 | 10.3 | 0.9 | 1.5 |
| 2 | P16 | 10.8 | 0.0 | 0.3 |
| 2 | P17 | 10.6 | 0.0 | 0.2 |
| 2 | P18 | 12.0 | 0.8 | 2.8 |
| 2 | P19 | 12.8 | 0.5 | 1.4 |
| 2 | P20 | 10.0 | 3.4 | 4.2 |
| 2 | P21 | 10.6 | 1.6 | 1.4 |
| 2 | P22 | 11.1 | 0.6 | 0.7 |
| 2 | P23 | 11.3 | 0.5 | 0.4 |
| 2 | P24 | 12.8 | 0.1 | 0.1 |
| 2 | P25 | 13.0 | 1.5 | 1.5 |
| 3 | P1  | 13.9 | 4.1 | 1.6 |
| 3 | P2  | 13.5 | 1.0 | 1.4 |
| 3 | P3  | 11.3 | 1.1 | 1.2 |
| 3 | P4  | 11.1 | 1.9 | 2.0 |
| 3 | P5  | 11.2 | 1.3 | 2.6 |
| 3 | P6  | 9.6  | 2.0 | 2.6 |
| 3 | P7  | 13.5 | 2.2 | 1.6 |
| 3 | P8  | 13.6 | 1.8 | 1.4 |
| 3 | P9  | 13.4 | 0.2 | 0.4 |
| 3 | P10 | 11.5 | 1.2 | 1.2 |
| 3 | P11 | 10.8 | 1.4 | 1.8 |
| 3 | P12 | 11.2 | 2.0 | 1.5 |
| 3 | P13 | 10.2 | 1.9 | 3.0 |
| 3 | P14 | 10.1 | 2.2 | 2.2 |
| 3 | P15 | 11.2 | 2.7 | 2.9 |
| 3 | P16 | 10.5 | 0.5 | 1.2 |
| 3 | P17 | 11.6 | 1.6 | 1.5 |
| 3 | P18 | 13.6 | 0.2 | 2.5 |
| 3 | P19 | 13.2 | 4.4 | 1.2 |
| 3 | P20 | 10.0 | 1.4 | 2.4 |
| 3 | P21 | 10.2 | 3.1 | 3.0 |
| 3 | P22 | 11.0 | 1.6 | 1.7 |
| 3 | P23 | 11.0 | 0.5 | 3.6 |
| 3 | P24 | 12.9 | 1.8 | 1.5 |
| 3 | P25 | 13.0 | 2.3 | 2.0 |
| 4 | P1  | 13.8 | 1.0 | 3.7 |
| 4 | P2  | 13.0 | 0.4 | 5.0 |
| 4 | P3  | 11.6 | 3.1 | 3.7 |
| 4 | P4  | 11.0 | 0.7 | 1.7 |
| 4 | P5  | 10.7 | 0.9 | 3.6 |
| 4 | P6  | 10.4 | 1.8 | 2.2 |
| 4 | P7  | 13.3 | 1.9 | 4.1 |
| 4 | P8  | 13.3 | 1.8 | 2.2 |
| 4 | P9  | 13.0 | 0.2 | 2.3 |
| 4 | P10 | 12.0 | 0.3 | 1.1 |
| 4 | P11 | 11.6 | 0.8 | 0.6 |

Tracking Code: TC0327-N/A-0228

Part #: PLCC-044-T-A

Part description: PLCC

|   |     |      |      |      |
|---|-----|------|------|------|
| 4 | P12 | 11.3 | 1.0  | 2.3  |
| 4 | P13 | 10.2 | 1.5  | 2.6  |
| 4 | P14 | 10.5 | 1.8  | 3.6  |
| 4 | P15 | 11.0 | 1.8  | 2.7  |
| 4 | P16 | 11.1 | 0.8  | -0.3 |
| 4 | P17 | 11.4 | 2.6  | -0.3 |
| 4 | P18 | 13.1 | 0.2  | 1.7  |
| 4 | P19 | 13.0 | 0.8  | 1.8  |
| 4 | P20 | 10.1 | 5.7  | 3.2  |
| 4 | P21 | 10.3 | 2.6  | 2.1  |
| 4 | P22 | 10.9 | 1.9  | 1.1  |
| 4 | P23 | 10.8 | 0.3  | 1.3  |
| 4 | P24 | 12.8 | 0.2  | 0.9  |
| 4 | P25 | 13.0 | 1.6  | 2.0  |
| 5 | P1  | 11.8 | 0.3  | 1.7  |
| 5 | P2  | 11.6 | 0.3  | 1.7  |
| 5 | P3  | 10.9 | 0.6  | 1.5  |
| 5 | P4  | 10.5 | 1.9  | 2.4  |
| 5 | P5  | 10.6 | 0.5  | 2.5  |
| 5 | P6  | 10.0 | 1.9  | 2.9  |
| 5 | P7  | 11.7 | 2.4  | 2.5  |
| 5 | P8  | 11.7 | 3.2  | 3.3  |
| 5 | P9  | 11.6 | 1.1  | 2.2  |
| 5 | P10 | 10.6 | 0.2  | 0.9  |
| 5 | P11 | 9.8  | 0.2  | 1.6  |
| 5 | P12 | 10.2 | 2.0  | 2.7  |
| 5 | P13 | 9.9  | 1.5  | 1.4  |
| 5 | P14 | 9.6  | 1.9  | 2.0  |
| 5 | P15 | 10.1 | 1.5  | 2.3  |
| 5 | P16 | 10.4 | 1.7  | 1.6  |
| 5 | P17 | 10.4 | 4.2  | 1.4  |
| 5 | P18 | 11.3 | 0.6  | 0.8  |
| 5 | P19 | 11.6 | 0.3  | 0.4  |
| 5 | P20 | 10.0 | 5.3  | 4.3  |
| 5 | P21 | 10.3 | 0.5  | 2.0  |
| 5 | P22 | 10.7 | 0.3  | 1.0  |
| 5 | P23 | 10.8 | 0.9  | 2.0  |
| 5 | P24 | 11.4 | 2.1  | 4.3  |
| 5 | P25 | 12.0 | 3.9  | 1.5  |
| 6 | P1  | 13.7 | 0.4  | 1.2  |
| 6 | P2  | 14.1 | 0.6  | 0.9  |
| 6 | P3  | 11.7 | 1.2  | 1.6  |
| 6 | P4  | 11.6 | 0.8  | 1.1  |
| 6 | P5  | 10.6 | 1.1  | 2.3  |
| 6 | P6  | 11.4 | -0.2 | 0.0  |
| 6 | P7  | 14.2 | 1.5  | 2.6  |
| 6 | P8  | 14.1 | 2.1  | 2.7  |
| 6 | P9  | 13.7 | 0.7  | 0.2  |
| 6 | P10 | 11.8 | 1.2  | 1.5  |
| 6 | P11 | 10.9 | 0.4  | 1.6  |

Tracking Code: TC0327-N/A-0228

Part #: PLCC-044-T-A

Part description: PLCC

|   |     |      |     |     |
|---|-----|------|-----|-----|
| 6 | P12 | 11.5 | 1.2 | 2.2 |
| 6 | P13 | 11.6 | 0.4 | 5.1 |
| 6 | P14 | 10.3 | 1.7 | 3.6 |
| 6 | P15 | 11.0 | 1.4 | 2.6 |
| 6 | P16 | 10.9 | 0.6 | 2.0 |
| 6 | P17 | 11.7 | 0.2 | 1.2 |
| 6 | P18 | 13.6 | 0.3 | 1.8 |
| 6 | P19 | 13.6 | 0.5 | 1.4 |
| 6 | P20 | 9.6  | 1.6 | 2.2 |
| 6 | P21 | 11.0 | 1.2 | 1.7 |
| 6 | P22 | 12.4 | 0.2 | 0.5 |
| 6 | P23 | 11.2 | 0.2 | 0.5 |
| 6 | P24 | 13.4 | 0.6 | 2.3 |
| 6 | P25 | 14.0 | 1.3 | 3.4 |
| 7 | P1  | 14.5 | 1.9 | 2.5 |
| 7 | P2  | 14.3 | 1.2 | 1.8 |
| 7 | P3  | 11.9 | 1.0 | 2.7 |
| 7 | P4  | 11.5 | 1.5 | 2.2 |
| 7 | P5  | 12.2 | 2.1 | 0.9 |
| 7 | P6  | 10.4 | 2.6 | 4.0 |
| 7 | P7  | 14.5 | 1.6 | 2.0 |
| 7 | P8  | 15.0 | 1.0 | 1.0 |
| 7 | P9  | 14.1 | 0.6 | 1.4 |
| 7 | P10 | 12.3 | 4.0 | 1.3 |
| 7 | P11 | 11.6 | 2.1 | 1.7 |
| 7 | P12 | 11.4 | 1.7 | 2.8 |
| 7 | P13 | 10.9 | 1.9 | 3.3 |
| 7 | P14 | 10.7 | 1.7 | 2.5 |
| 7 | P15 | 11.1 | 1.4 | 2.0 |
| 7 | P16 | 11.3 | 1.1 | 1.2 |
| 7 | P17 | 12.2 | 1.2 | 1.5 |
| 7 | P18 | 13.6 | 0.9 | 2.8 |
| 7 | P19 | 13.7 | 1.6 | 1.0 |
| 7 | P20 | 10.8 | 1.6 | 3.0 |
| 7 | P21 | 11.3 | 1.8 | 1.5 |
| 7 | P22 | 11.4 | 2.0 | 1.6 |
| 7 | P23 | 11.7 | 2.4 | 1.4 |
| 7 | P24 | 14.3 | 0.9 | 0.0 |
| 7 | P25 | 14.0 | 2.1 | 1.6 |
| 8 | P1  | 12.0 | 0.0 | 0.6 |
| 8 | P2  | 11.5 | 0.2 | 1.0 |
| 8 | P3  | 11.0 | 1.3 | 1.7 |
| 8 | P4  | 10.0 | 1.7 | 2.0 |
| 8 | P5  | 10.3 | 1.7 | 1.9 |
| 8 | P6  | 10.2 | 1.3 | 1.4 |
| 8 | P7  | 11.9 | 1.5 | 1.9 |
| 8 | P8  | 12.0 | 1.4 | 2.0 |
| 8 | P9  | 11.6 | 0.6 | 2.5 |
| 8 | P10 | 11.3 | 1.0 | 3.0 |
| 8 | P11 | 10.7 | 0.2 | 0.7 |

Tracking Code: TC0327-N/A-0228

Part #: PLCC-044-T-A

Part description: PLCC

|   |     |      |      |     |
|---|-----|------|------|-----|
| 8 | P12 | 10.6 | 0.5  | 1.2 |
| 8 | P13 | 10.1 | 1.1  | 2.0 |
| 8 | P14 | 9.9  | 1.4  | 2.3 |
| 8 | P15 | 10.5 | 1.8  | 2.6 |
| 8 | P16 | 10.2 | 0.4  | 1.7 |
| 8 | P17 | 11.2 | -0.1 | 1.1 |
| 8 | P18 | 11.2 | 1.0  | 1.1 |
| 8 | P19 | 11.6 | 0.7  | 2.2 |
| 8 | P20 | 10.1 | 2.4  | 3.0 |
| 8 | P21 | 9.8  | 0.7  | 0.8 |
| 8 | P22 | 10.5 | 0.1  | 1.3 |
| 8 | P23 | 10.6 | 0.3  | 0.7 |
| 8 | P24 | 11.4 | 0.4  | 0.8 |
| 8 | P25 | 11.8 | 2.0  | 1.6 |

**EQUIPMENT AND CALIBRATION SCHEDULES****Equipment #:** THL-01**Description:** Temperature/Humidity Chart Recorder**Manufacturer:** Dickson**Model:** THDX**Serial #:** 9316255**Accuracy:** Temp: +/- 1C; Humidity: +/-2% RH (0 - 60%) +/- 3% RH (61 - 95%).

... Last Cal: 7/15/02, Next Cal: 7/15/03

**Equipment #:** MO-01**Description:** Micro-Ohmmeter**Manufacturer:** Keithley**Model:** 580**Serial #:** 0772740**Accuracy:** See Manual

... Last Cal: 6/12/03, Next Cal: 6/12/04

**Equipment #:** MO-03**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0791975**Accuracy:** See Manual

... Last Cal: 6/12/03, Next Cal: 6/12/04

**Equipment #:** THC-01**Description:** Temperature/Humidity Chamber**Manufacturer:** Thermotron**Model:** SM-8-7800**Serial #:** 30676**Accuracy:** See Manual

... Last Cal: 5/28/2003, Next Cal: 5/28/2004

**Equipment #:** OV-5**Description:** Nitrogen Purge IR Reflow**Manufacturer:** Vitronics Soltec**Model:** XPM-730**Serial #:** XN 70328**Accuracy:** +/- 5 deg. C