

**Applied Technology Services
Welding and NDE Services Group**
3400 Crow Canyon Rd
San Ramon, CA. 94583

PG&E Confidential
Final Report

**Pipe Characterization and Weld Assessment
San Carlos
Line 147
Mile Post 0.52**

ATS Report #: 413.61-13.390

Gas Project: ICDA

Line 147 Mile Point 0.52 San Carlos

Prepared by:

Redacted

Engineering Technician II
Welding & NDE Services

Reviewed by:

Redacted

Senior Program Manager
Welding & NDE Services

Redacted

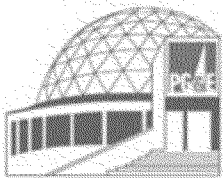


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Sections

1.0 Objectives:

The NDE Services Group of PG&E's Applied Technology Services (ATS) Division was requested to perform Radiography on the bottom 180° of the exposed section of pipe to look for any internal corrosion, pitting, and debris. Radiograph the 6" drip pot and 2" pipe between drip pot and valve to look for any liquids, or debris. Perform 12 point UT thickness surveys every foot on the 24" main line. Perform 12 point UT thickness surveys every 4" on the drip pot including the cap. Perform UT thickness surveys on the 2" piping between the drip pot and valve.

Mears performed a partial H-Form which is attached to the end of this report.

2.0 Results:

Line 147 Mile Point 0.52 San Carlos

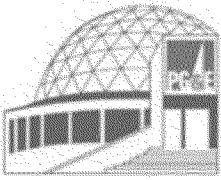
Radiography Results:

Main Line: ATS Radiographed from 3:00 to 9:00 the entire 8' exposed section of 24" pipe. No sign of internal corrosion, pitting, or debris were found. The 24" section of pipe has external corrosion cells on and around the reinforcement pad for the drip pot.

6" Drip Pot: ATS radiographed the drip pot and found it to be full of debris / sludge. Drip pot also has heavy external corrosion.

2" pipe between drip pot and valve: The 2" pipe is full of debris / sludge

2" Elbow past valve and 2" pipe running vertical: The bottom elbow has debris / sludge that stops at the first girth weld running vertical. The vertical section of pipe has no debris / sludge. The top elbow has a small buildup of debris / sludge on the bottom.



Line 147 Mile Point 0.52 San Carlos

Ultrasonic thickness surveys results:

24" Main line: The thickness readings are Maximum 0.340", Minimum 0.317", Average 0.329".

6" Drip pot: The thickness readings are Maximum 0.303", Minimum 0.250", Average 0.280".

Side of cap on drip pot: The thickness readings are Maximum 0.486", Minimum 0.431", Average 0.455".

Bottom of cap on drip pot: The thickness readings are Maximum 0.497", Minimum 0.436", Average 0.474".

2" pipe between drip pot and valve: The thickness readings are Maximum 0.169", Minimum 0.146", Average 0.158".

Line 147 Mile Point 0.52 San Carlos

External corrosion survey results

Component 1 24" Main line results: 8.00' Straight Pipe Component X 24" O.D.

EC-1: Average Wall Thickness: 0.325", Min. 0.244" for 25% Wall Loss.

EC-2 : Average Wall Thickness: 0.325", Min. 0.283" for 13% Wall Loss.

Component 2 Drip pot and 2" pipe between drip pot and valve

Drip Pot: 6.76" O.D. X 13.00" Long, with a 3.00" Cap on bottom of Drip Pot

2" pipe between drip pot and valve: 5.00" Straight pipe from start of Drip line to the 2.00" Valve

Note- the following Pipe Sections did not have any external corrosion

- 2.00" Stop Valve
- 90° Elbow going Up
- Straight Pipe
- 90° Elbow
- Release Cap Valve

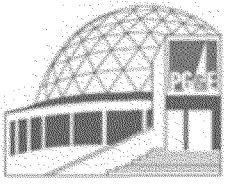
Component 2 Results: Drip Pot

EC-3: Average Wall Thickness: 0.280", Min. 0.138" for 50.69% Wall Loss, (Per Laser Scanner see attached Report). an Impression Casting of the corroded weld, drip pot to saddle weld was difficult to obtain using multiple methods. This was: 4.00" width X 0.800" Long and approximately 0.150"-0.200" metal loss.

EC-3-3: Average Wall Thickness: 0.280", Min. 0.207" for 26.1% Wall Loss.

3.0 Supporting Documents:

Refer to Attachments for photographs, radiographs, and detailed results.



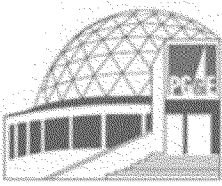
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Attachment A

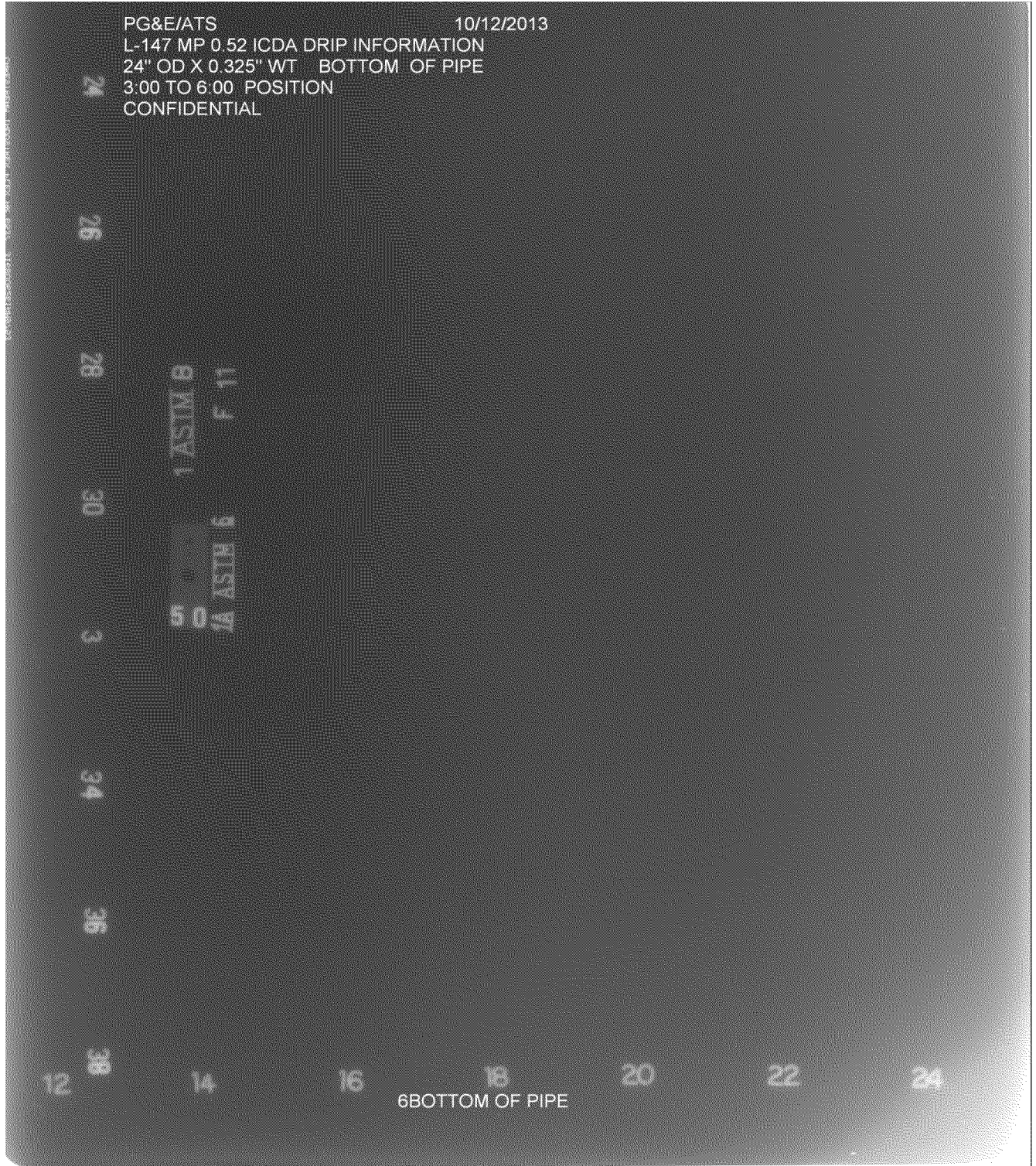
Line 147 Mile Point 0.52 San Carlos

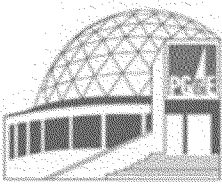
Performed radiography on the bottom 180° of the exposed section of pipe to look for any internal corrosion, pitting, and debris. Radiograph the 6" drip pot and 2" pipe between drip pot and valve to look for any liquids, or debris.





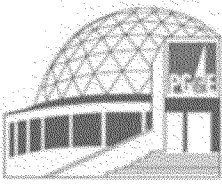
Radiograph of the 24" main line showing no internal corrosion





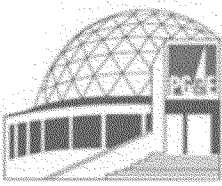
Radiograph of the 24" main line showing no internal corrosion



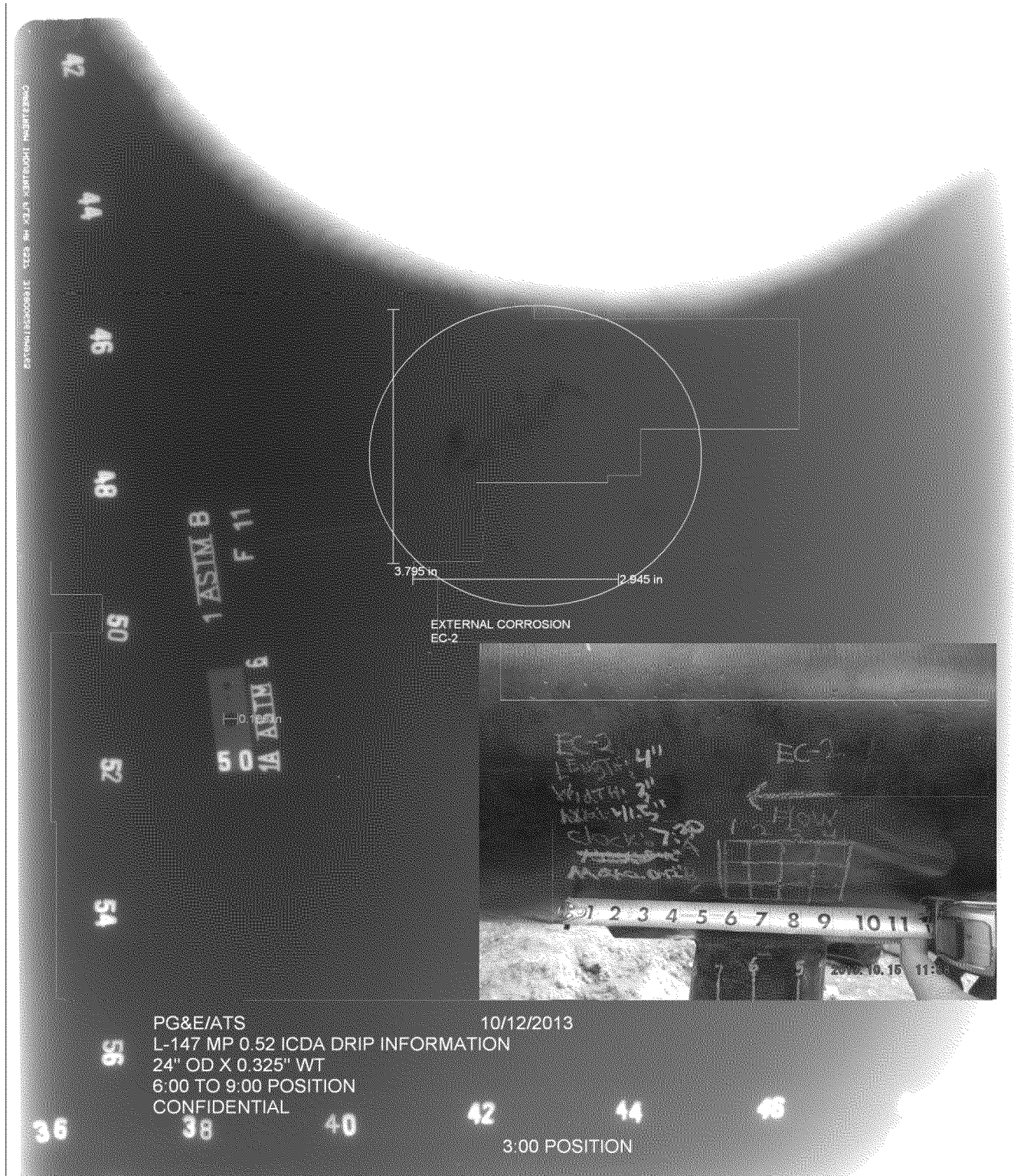


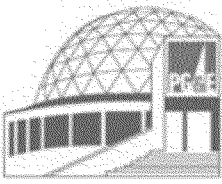
Radiograph of the 24" main line showing external corrosion cell (EC-1)



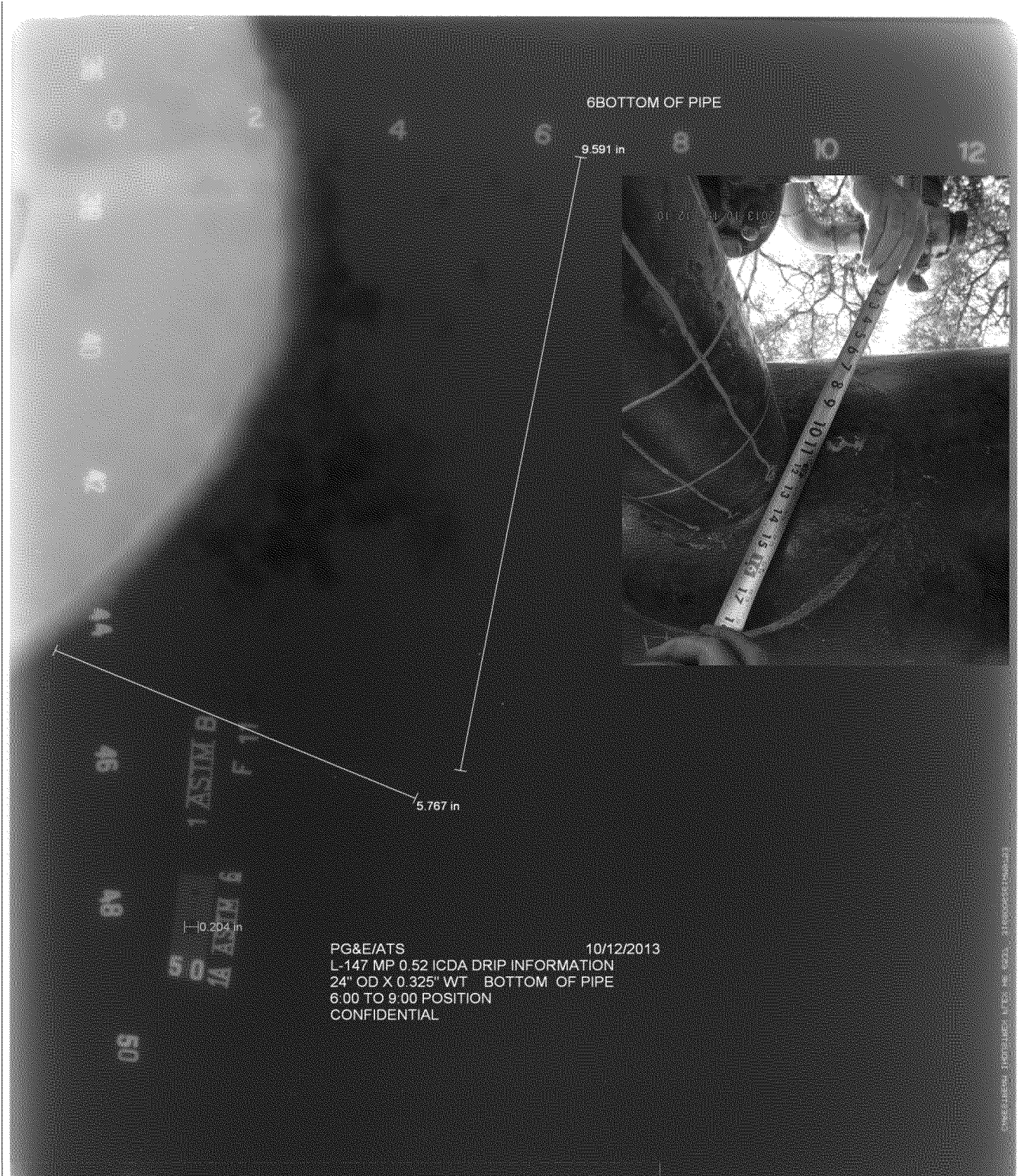


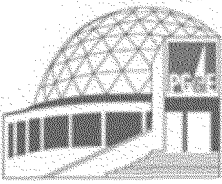
Radiograph of the 24" main line showing external corrosion cell (EC-2)



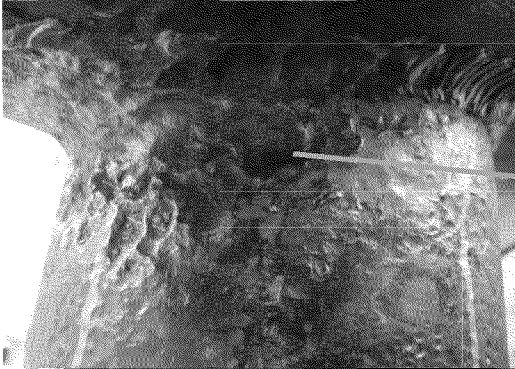


Radiograph of the 24" main line showing external corrosion cell (EC-3-1)

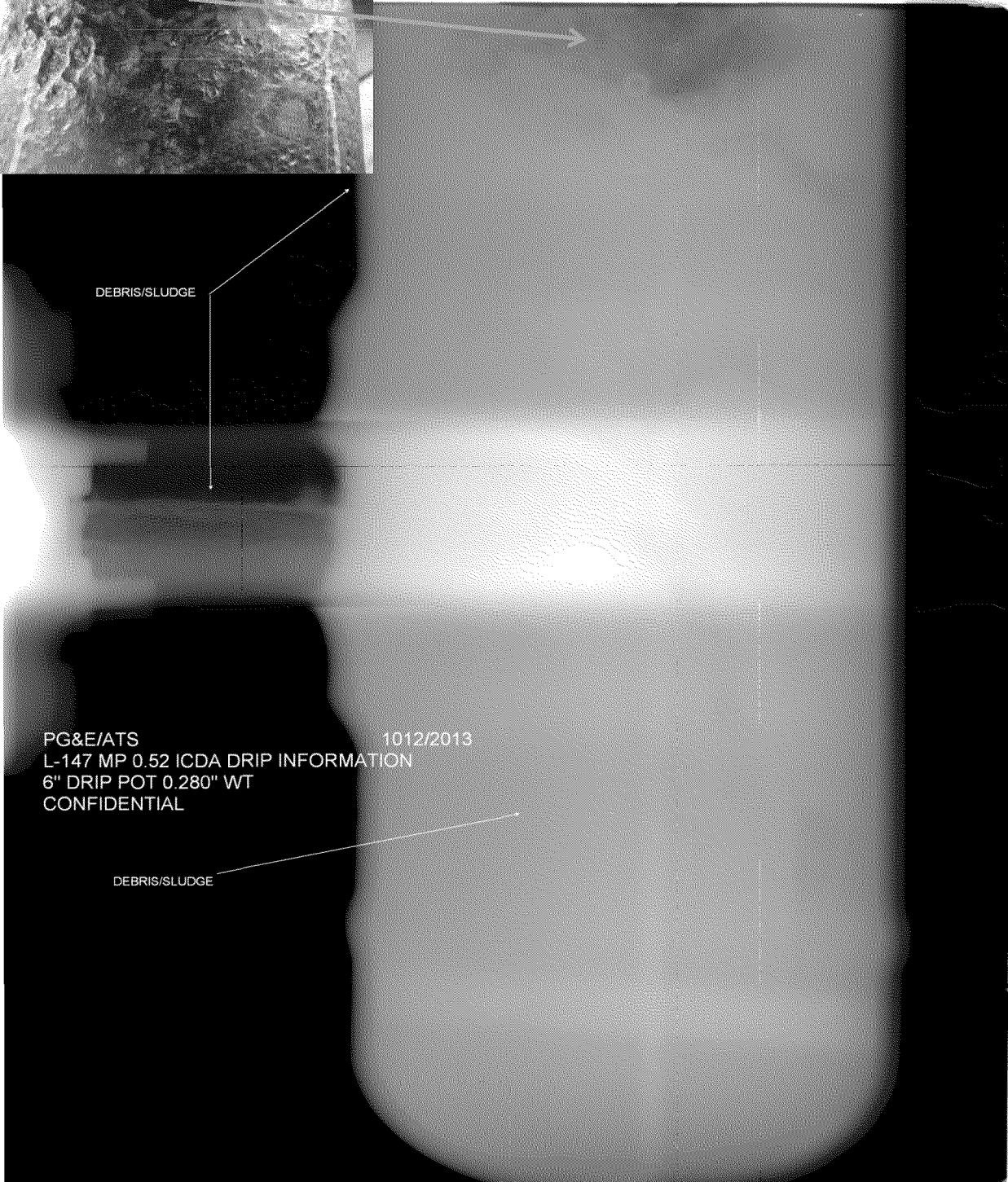




Radiograph of the Drip Pot showing debris / sludge inside of the drip pot and 2" pipe between the drip pot and valve.



Picture showing the external corrosion

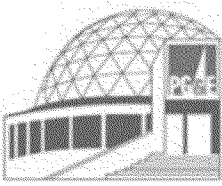


PG&E/ATS
L-147 MP 0.52 ICDA DRIP INFORMATION
6" DRIP POT 0.280" WT
CONFIDENTIAL

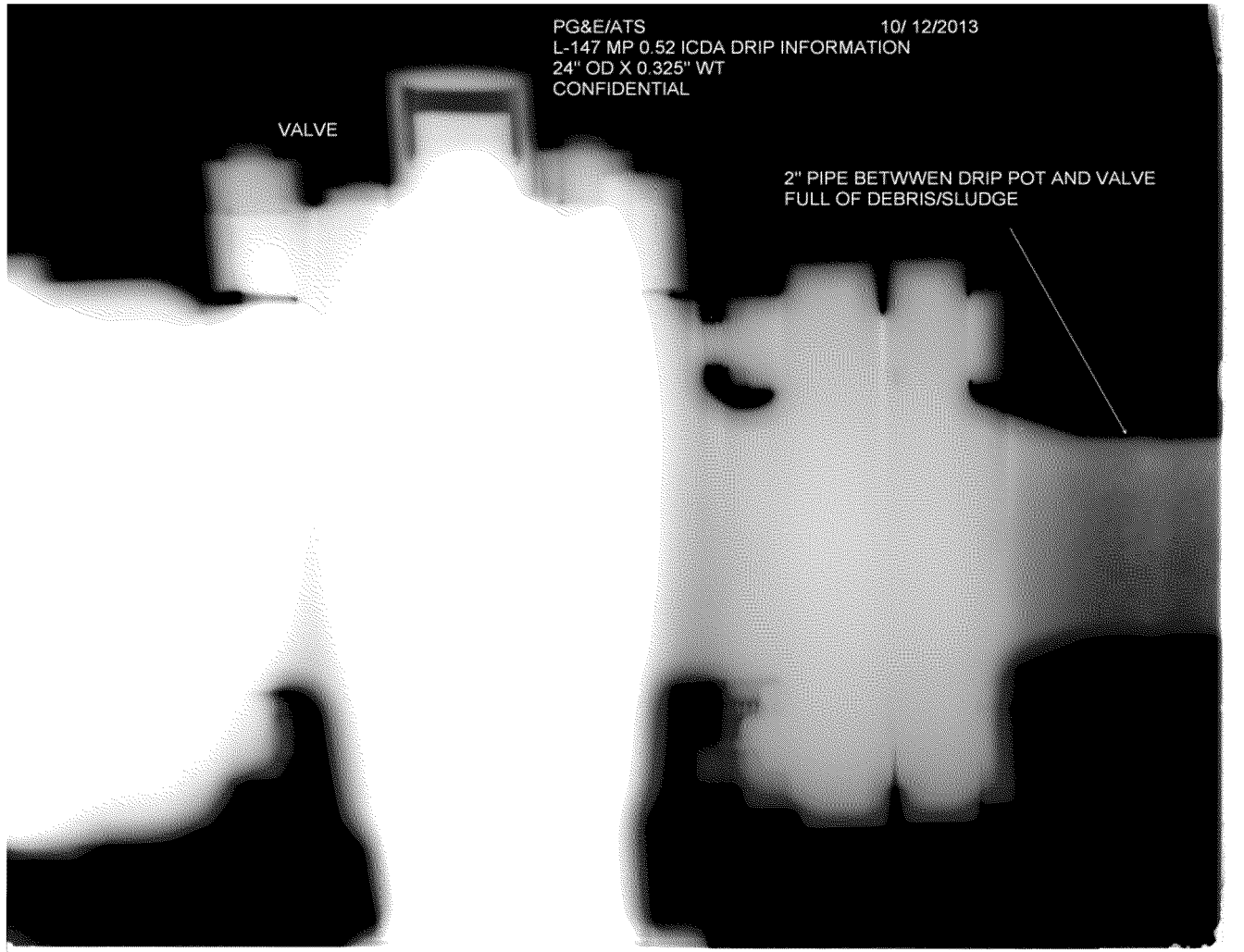
10/16/2013

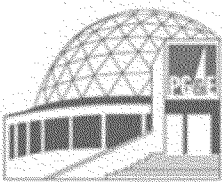
DEBRIS/SLUDGE

DEBRIS/SLUDGE



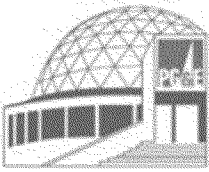
Radiograph of the 2" pipe between the drip pot and valve in the 90° position





Radiograph of the 2" piping past the vavle showing debris / slugde in the bottom 90 and a small amount of debris / sludge on the bottom of the upper 90





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Welding and NDE Services Group
 3400 Crow Canyon Rd
 San Ramon, CA. 94583

UT Thickness Report

| | | | |
|----------------------------------|---------------------------------------|----------------------|------------------|
| Work Location and Details | | | |
| Component & Item: | Line 147 Mile Point 0.52 San Carlos 0 | | |
| City: | San Carlos | GPS Lat / Long: | Redacted |
| Line: | 147 | Mile Post: | 0.52 |
| | | Date of Examination: | October 11, 2013 |

| | | | |
|------------------------------|------------------------------|---------------------------|------------------------|
| Inspection Parameters | | | |
| Thickness Meter / Model: | | Panametrics MG-X2 | Serial No.: 110928710 |
| Range (Inches): | 1" | Velocity (In /usec.): | 2334 |
| Transducer Make / Model: | Panametrics D790 SM | Gain (dB): | 42 |
| Size / Dia (Inches): | 0.312" | Frequency (mHz): | 5 |
| Calibration Block Info: | | C/S .100" - .250" 12-3708 | |
| Echo-To-Echo Feature: | Off | Method: | |
| | | Calibration: | Time: |
| | | In | 16:00 |
| | | Out | 20:00 |
| Couplant: | UT-X Couplant | Batch No.: | 11163E |
| Procedure No. / Rev.: | ATS-UT-300 (C/S Pipe / Comp) | Temperature °F: | Ambient |
| | | Acceptance: | For Client Information |

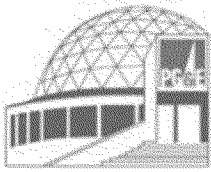
| | | | |
|--------------------------|--------------|-----------------------|-----------|
| Component Details | | | |
| Size / Dia: | 24 | Circumference: | 75.40 |
| Surface Finish: | Wire Wheeled | Long Seam Clock Pos.: | 2:00 |
| | | Nominal Thickness: | See Below |
| | | Average Thickness: | See Below |



| | | | |
|-----------------|----------|---------------|-------------------------------|
| Comments: N/A | | | |
| Examiner | Redacted | Level: | II |
| | | Title: | Senior Engineering Technician |
| | | | Date: 10/11/2013 |

ATS Report #:413.61-13.390
 Report Revision #0

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UT Thickness Report

24" Header: Exposed 4' either side of drip, 360-degrees, 8' total.

Performed 12 point UT thickness readings every foot.

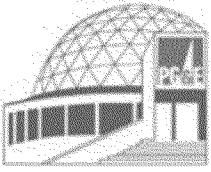
| | 0' | 1' | 2' | 3' | 4' | 5' | 6' | 7' | 8' |
|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 12:00 | 0.332 | 0.337 | 0.323 | 0.334 | 0.332 | 0.330 | 0.330 | 0.330 | 0.328 |
| 1:00 | 0.323 | 0.327 | 0.325 | 0.325 | 0.324 | 0.322 | 0.320 | 0.320 | 0.319 |
| 2:00 | 0.325 | 0.321 | 0.321 | 0.324 | 0.323 | 0.318 | 0.317 | 0.318 | 0.319 |
| 3:00 | 0.321 | 0.323 | 0.322 | 0.324 | 0.324 | 0.317 | 0.319 | 0.320 | 0.319 |
| 4:00 | 0.328 | 0.332 | 0.330 | 0.331 | 0.325 | 0.326 | 0.326 | 0.331 | 0.327 |
| 5:00 | 0.336 | 0.338 | 0.337 | 0.336 | 0.331 | 0.334 | 0.332 | 0.332 | 0.327 |
| 6:00 | 0.333 | 0.335 | 0.332 | 0.331 | 0.331 | 0.329 | 0.331 | 0.328 | 0.327 |
| 7:00 | 0.331 | 0.331 | 0.331 | 0.330 | 0.328 | 0.330 | 0.328 | 0.328 | 0.325 |
| 8:00 | 0.333 | 0.332 | 0.334 | 0.335 | 0.330 | 0.331 | 0.331 | 0.327 | 0.326 |
| 9:00 | 0.333 | 0.333 | 0.333 | 0.334 | 0.329 | 0.333 | 0.330 | 0.329 | 0.329 |
| 10:00 | 0.334 | 0.334 | 0.336 | 0.340 | 0.331 | 0.331 | 0.332 | 0.330 | 0.328 |
| 11:00 | 0.337 | 0.337 | 0.337 | 0.337 | 0.335 | 0.336 | 0.334 | 0.333 | 0.330 |
| | | | | | | | | | |
| Maximum Found: | 0.337 | 0.338 | 0.337 | 0.340 | 0.335 | 0.336 | 0.334 | 0.333 | 0.330 |
| Minimum Found: | 0.321 | 0.321 | 0.321 | 0.324 | 0.323 | 0.317 | 0.317 | 0.318 | 0.319 |
| Average thickness: | 0.331 | 0.332 | 0.330 | 0.332 | 0.329 | 0.328 | 0.328 | 0.327 | 0.325 |



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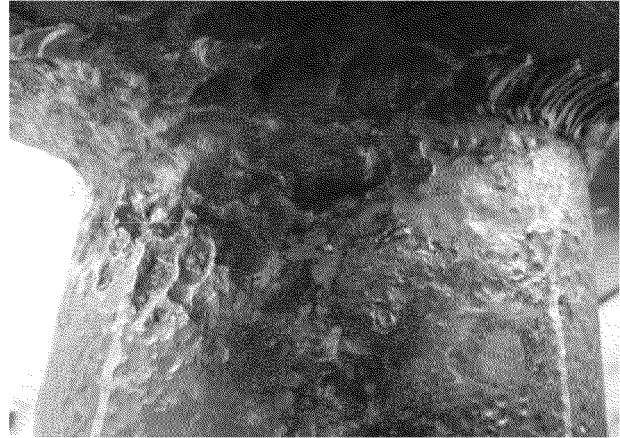
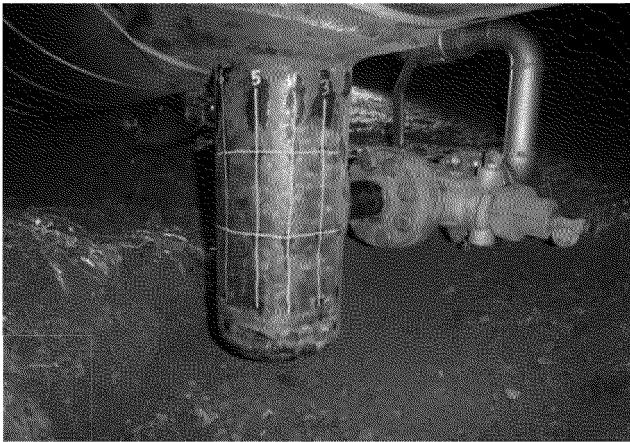
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UT Thickness Report

6" Drip pot and end cap UT thickness readings Readings taken at 4" increments.

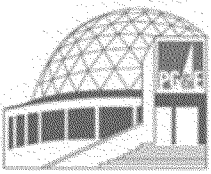
| | 0" | 4" | 8" | 12" | Side of Cap |
|--------------------|-------|-------|-------|-------|-------------|
| 12:00 | 0.293 | 0.282 | Repad | 0.280 | 0.486 |
| 1:00 | 0.291 | 0.283 | Repad | 0.285 | 0.441 |
| 2:00 | 0.273 | 0.280 | 0.266 | 0.276 | 0.444 |
| 3:00 | 0.250 | 0.250 | 0.260 | 0.254 | 0.455 |
| 4:00 | 0.250 | 0.261 | 0.258 | 0.259 | 0.431 |
| 5:00 | 0.268 | 0.273 | 0.277 | 0.279 | 0.444 |
| 6:00 | 0.292 | 0.281 | 0.288 | 0.284 | 0.452 |
| 7:00 | 0.287 | 0.299 | 0.296 | 0.288 | 0.466 |
| 8:00 | 0.287 | 0.288 | 0.278 | 0.271 | 0.469 |
| 9:00 | 0.303 | 0.302 | 0.300 | 0.291 | 0.449 |
| 10:00 | 0.297 | 0.294 | 0.288 | 0.278 | 0.469 |
| 11:00 | 0.285 | 0.292 | Repad | 0.274 | 0.457 |
| Summary: | | | | | |
| Maximum Found: | 0.303 | 0.302 | 0.300 | 0.291 | 0.486 |
| Minimum Found: | 0.250 | 0.250 | 0.258 | 0.254 | 0.431 |
| Average thickness: | 0.281 | 0.282 | 0.279 | 0.277 | 0.455 |



EC 3-1 UT thickness survey of corrosion cell between the reinforcement pad and the drip pot using a pencil probe.

| Position | UT reading | Remaining wall |
|---|------------|----------------|
| 7:00 | 0.162 | 42.14% |
| plus 1" | 0.179 | 36.07% |
| 8:00 | 0.216 | 22.85% |
| plus 1" | 0.185 | 33.92% |
| 9:00 | 0.160 | 42.85% |
| Average wall thickness for the drip pot: | | 0.280 |

Equipment: Epoch 4 S/N 21417606
 Transducer: Panamentrics Sonopen V260 RM 15/125 S/N 164310
 Velocity: 0.2346
 Range: 1.00"
 Decables: 58.5
 Step Wedge: Panametrics 2214E
 1018 Steel S/N 8840
 Performed by Redacted



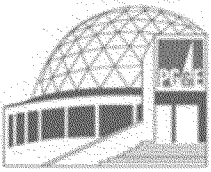
UT Thickness Report

Bottom of the 6" Drip Pot UT thickness reading layout.



| | |
|----------------------------|-------|
| Outer Ring Clockwise | 0.473 |
| | 0.476 |
| | 0.466 |
| | 0.464 |
| | 0.464 |
| | 0.463 |
| | 0.479 |
| | 0.473 |
| | 0.458 |
| | 0.469 |
| | 0.460 |
| | 0.436 |
| Inner ring going clockwise | 0.480 |
| | 0.486 |
| | 0.497 |
| | 0.483 |
| | 0.482 |
| | 0.473 |
| Center | 0.488 |
| | 0.493 |

| | |
|--------------------|-------|
| Maximum Found: | 0.497 |
| Minimum Found: | 0.436 |
| Average thickness: | 0.474 |



UT Thickness Report

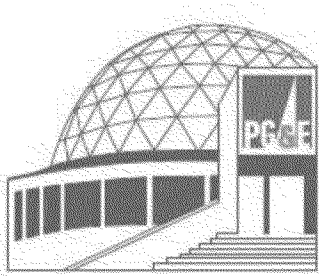
2" pipe between drip pot and valve.

| | 12 top | 1:30 | 3:00 North | 4:30 | 6:00 Bottom | 7:30 | 9:00 South | 10:30 |
|--------------------|--------|-------|------------|-------|----------------|-------|------------|-------|
| Loc 1 | 0.158 | 0.165 | 0.156 | 0.166 | 0.146 | 0.160 | 0.158 | 0.160 |
| Loc 2 | 0.162 | 0.162 | 0.158 | 0.169 | 0.163 | 0.153 | 0.160 | 0.159 |
| Loc 3 | 0.157 | 0.158 | 0.162 | 0.153 | 0.148 | 0.150 | 0.166 | 0.149 |
| Loc 4 | 0.156 | 0.157 | 0.158 | 0.161 | 0.155 | 0.160 | 0.168 | 0.152 |
| Maximum Found: | 0.162 | 0.165 | 0.162 | 0.169 | 0.163 | 0.160 | 0.168 | 0.160 |
| Minimum Found: | 0.156 | 0.157 | 0.156 | 0.153 | 0.146 | 0.150 | 0.158 | 0.149 |
| Average thickness: | 0.158 | 0.161 | 0.159 | 0.162 | 0.153 | 0.156 | 0.163 | 0.155 |



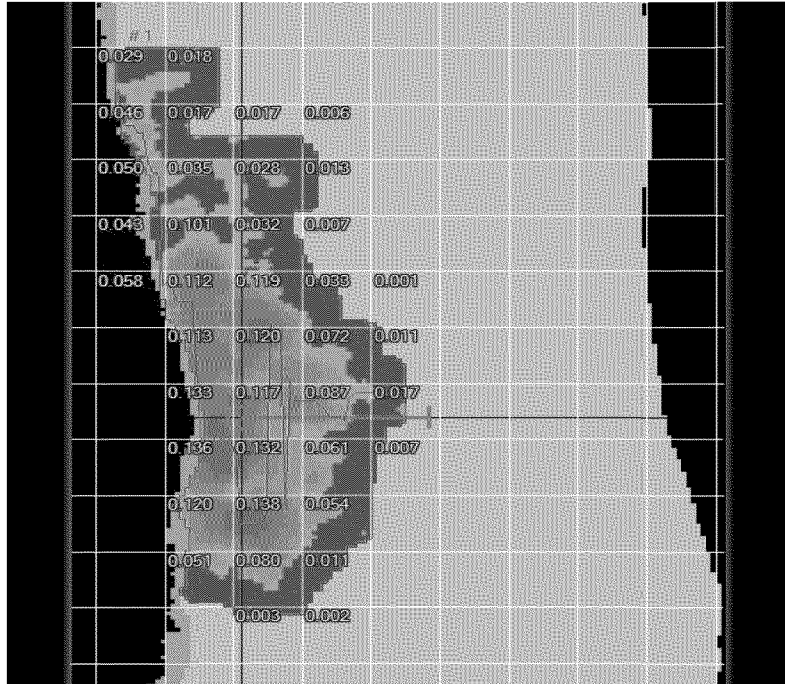
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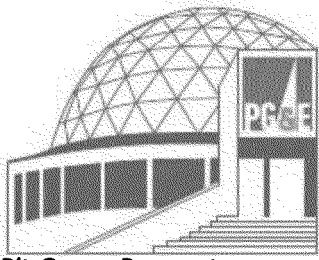


Creaform Laser Scanner Data for Drip Pot EC-3

Inspection Overview:



| | | |
|--------------------------|-----------------------------------|----|
| Scan Date | Tuesday, October 15, 2013 6:19 PM | |
| Report Creation Date | Tuesday, October 15, 2013 7:18 PM | |
| Pipe Owner | Pacific Gas and Electric | |
| Pipe Name | L-147 MP 0.52 | |
| Technician Name | Redacted | |
| Inspector Name | | |
| Number of Features Found | | |
| Scan Resolution | 0.039 | in |
| Nominal Pipe Diameter | 6.650 | in |
| Pipe Wall Thickness | 0.280 | in |
| Analyzed Surface | Outer Surface | |



Creaform Laser Scanner Data for Drip Pot EC-3

Pit-Gauge Parameters:

| | | | |
|---------------|----------|--------------|----------|
| Center Length | 3.000 in | Extension | 6.000 in |
| Minimum Ext. | 0 | Maximum Ext. | 5 |
| Symmetric? | | | |

Flow Stress Parameters:

| | |
|-------------------------------|--------------------|
| SMYS | psi |
| Material | Plain Carbon Steel |
| Temperature | °F |
| S _{ut} | 0.000 psi |
| S _{yt} | 0.000 psi |
| S _{flow} B31G | psi (Method 1) |
| S _{flow} Modif. B31G | psi (Method 1) |
| S _{flow} Eff. Area | psi (Method 1) |
| Design Factor | 1 |
| MAOP | psi |

Interaction Parameters:

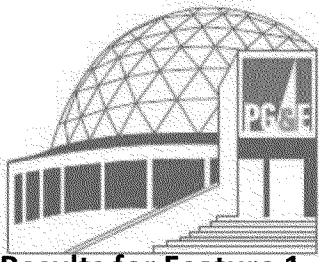
| | |
|--------------------------|--------------|
| Axial Criteria | in |
| Circumferential Criteria | in |
| Critical Factor | % |
| Threshold | |
| Method | Fit To Shape |
| Filter | None |
| MOP | psi |

Inspection Zone :

| | |
|--------------------------------------|----------|
| Worst Case Profile Resolution | 0.039 in |
| Absolute Axial Position of Reference | 0.000 in |
| Absolute Circ. Position of Reference | 0.000 ° |
| Comment | |

Features Summary:

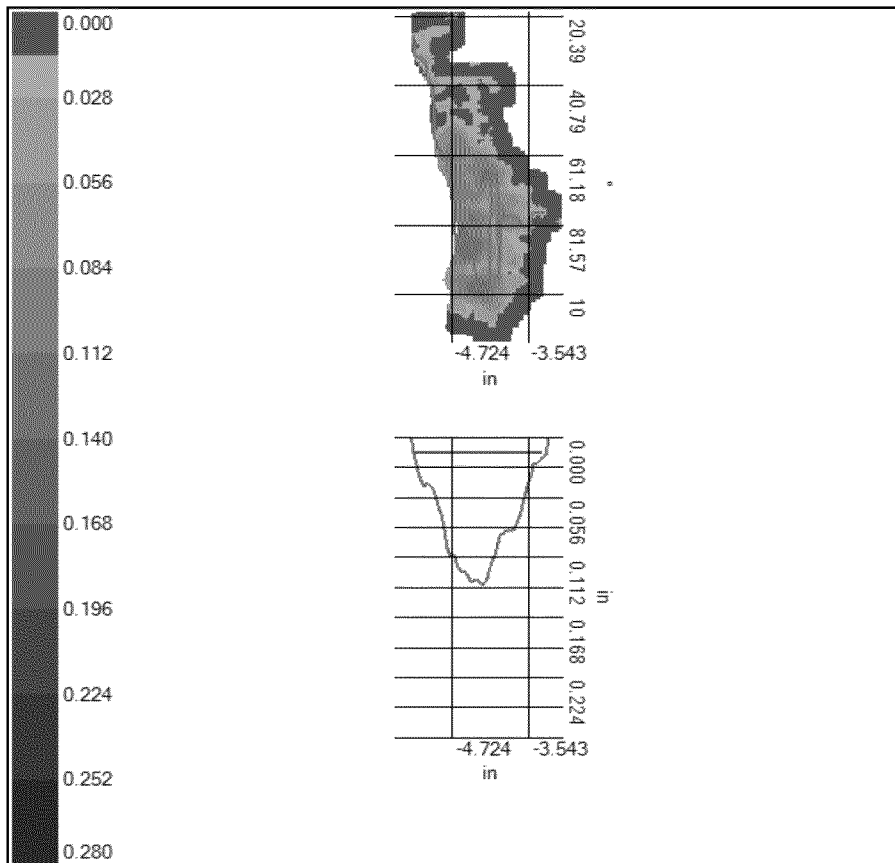
| Feature ID | Axial Start | Circ. Start | Max. Depth |
|------------|-------------|-------------|-------------------|
| | in | ° | % Rem. Wall in |
| Feature 1 | -5.354 | 23.09 | 0.138 50.698 |

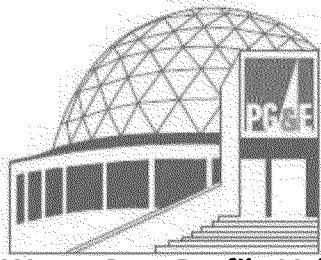


Creaform Laser Scanner Data for Drip Pot EC-3

Results for Feature 1

| | |
|--------------|-----------|
| Axial Start | -5.354 in |
| Axial End | -3.268 in |
| Axial Length | 2.087 in |
| Circ. Start | 23.090 ° |
| Circ. End | 111.400 ° |
| Circ. Length | 88.300 ° |
| Max. Depth | 0.138 in |
| Axial Pos. | -4.272 in |
| Circ. Pos. | 100.190 ° |





Creaform Laser Scanner Data for Drip Pot EC-3

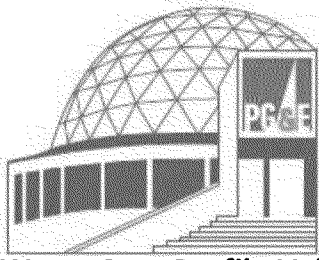
Worst Case Profile Values for Feature 1

| Axial (in) | Circ. (°) | Depth (in) | Depth (%) | RWT (in) | RWT (%) | Pit Gauge |
|--------------|-------------|--------------|-------------|------------|-----------|-----------|
| -5.394 | 25.830 | 0.000 | 0.000 | 0.280 | 100.000 | |
| -5.354 | 25.830 | 0.016 | 5.873 | 0.264 | 94.127 | |
| -5.315 | 31.950 | 0.025 | 8.909 | 0.255 | 91.091 | |
| -5.276 | 31.950 | 0.035 | 12.375 | 0.245 | 87.625 | |
| -5.236 | 31.950 | 0.041 | 14.740 | 0.239 | 85.260 | |
| -5.197 | 33.310 | 0.046 | 16.429 | 0.234 | 83.571 | |
| -5.158 | 33.310 | 0.042 | 15.043 | 0.238 | 84.957 | |
| -5.118 | 38.070 | 0.044 | 15.723 | 0.236 | 84.277 | |
| -5.079 | 40.110 | 0.046 | 16.546 | 0.234 | 83.454 | |
| -5.039 | 40.110 | 0.050 | 17.932 | 0.230 | 82.068 | |
| -5.000 | 59.140 | 0.058 | 20.846 | 0.222 | 79.154 | |
| -4.961 | 58.460 | 0.067 | 23.988 | 0.213 | 76.012 | |
| -4.921 | 59.820 | 0.073 | 26.089 | 0.207 | 73.911 | |
| -4.882 | 61.860 | 0.087 | 30.979 | 0.193 | 69.021 | |
| -4.843 | 61.860 | 0.102 | 36.551 | 0.178 | 63.449 | |
| -4.803 | 61.860 | 0.109 | 38.863 | 0.171 | 61.137 | |
| -4.764 | 61.860 | 0.110 | 39.316 | 0.170 | 60.684 | |
| -4.724 | 75.450 | 0.110 | 39.214 | 0.170 | 60.786 | |
| -4.685 | 87.690 | 0.119 | 42.584 | 0.161 | 57.416 | |
| -4.646 | 85.650 | 0.124 | 44.166 | 0.156 | 55.834 | |
| -4.606 | 86.330 | 0.126 | 44.943 | 0.154 | 55.057 | |
| -4.567 | 84.290 | 0.124 | 44.423 | 0.156 | 55.577 | |
| -4.528 | 85.650 | 0.129 | 45.917 | 0.151 | 54.083 | |
| -4.488 | 84.970 | 0.133 | 47.461 | 0.147 | 52.539 | |
| -4.449 | 85.650 | 0.136 | 48.436 | 0.144 | 51.564 | |
| -4.409 | 89.050 | 0.132 | 47.066 | 0.148 | 52.934 | |
| -4.370 | 99.930 | 0.133 | 47.648 | 0.147 | 52.352 | |
| -4.331 | 99.930 | 0.136 | 48.475 | 0.144 | 51.525 | |
| -4.291 | 99.930 | 0.138 | 49.302 | 0.142 | 50.698 | |
| | | | | | | |
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Report Revision #0

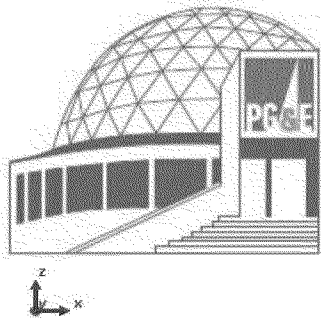
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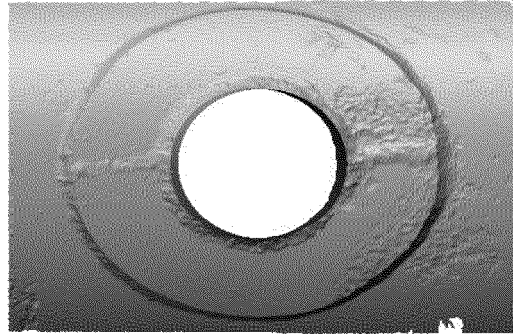
Creaform Laser Scanner Data for Drip Pot EC-3

Worst Case Profile Values for Feature 1 Continued

| Axial (in) | Circ. (°) | Depth (in) | Depth (%) | RWT (in) | RWT (%) | Pit Gauge |
|--------------|-------------|--------------|-------------|------------|-----------|-----------|
| -4.252 | 99.930 | 0.136 | 48.541 | 0.144 | 51.459 | |
| -4.213 | 99.250 | 0.130 | 46.481 | 0.150 | 53.519 | |
| -4.173 | 99.250 | 0.121 | 43.144 | 0.159 | 56.856 | |
| -4.134 | 65.940 | 0.114 | 40.761 | 0.166 | 59.239 | |
| -4.095 | 66.620 | 0.109 | 38.975 | 0.171 | 61.025 | |
| -4.055 | 66.620 | 0.099 | 35.460 | 0.181 | 64.540 | |
| -4.016 | 97.210 | 0.090 | 32.173 | 0.190 | 67.827 | |
| -3.976 | 75.450 | 0.090 | 32.248 | 0.190 | 67.752 | |
| -3.937 | 78.850 | 0.087 | 31.112 | 0.193 | 68.888 | |
| -3.898 | 78.850 | 0.087 | 30.977 | 0.193 | 69.023 | |
| -3.858 | 78.850 | 0.086 | 30.614 | 0.194 | 69.386 | |
| -3.819 | 78.850 | 0.087 | 31.099 | 0.193 | 68.901 | |
| -3.780 | 78.850 | 0.083 | 29.476 | 0.198 | 70.524 | |
| -3.740 | 79.530 | 0.077 | 27.411 | 0.203 | 72.589 | |
| -3.701 | 80.210 | 0.071 | 25.289 | 0.209 | 74.711 | |
| -3.661 | 81.570 | 0.060 | 21.304 | 0.220 | 78.696 | |
| -3.622 | 81.570 | 0.051 | 18.207 | 0.229 | 81.793 | |
| -3.583 | 81.570 | 0.042 | 15.110 | 0.238 | 84.890 | |
| -3.543 | 82.250 | 0.036 | 12.917 | 0.244 | 87.083 | |
| -3.504 | 78.170 | 0.025 | 8.888 | 0.255 | 91.112 | |
| -3.465 | 77.490 | 0.025 | 8.764 | 0.256 | 91.236 | |
| -3.425 | 77.490 | 0.023 | 8.022 | 0.258 | 91.978 | |
| -3.386 | 77.490 | 0.020 | 7.281 | 0.260 | 92.719 | |
| -3.347 | 77.490 | 0.018 | 6.367 | 0.262 | 93.633 | |
| -3.307 | 77.490 | 0.016 | 5.650 | 0.264 | 94.350 | |
| -3.268 | 77.490 | 0.000 | 0.000 | 0.280 | 100.000 | |

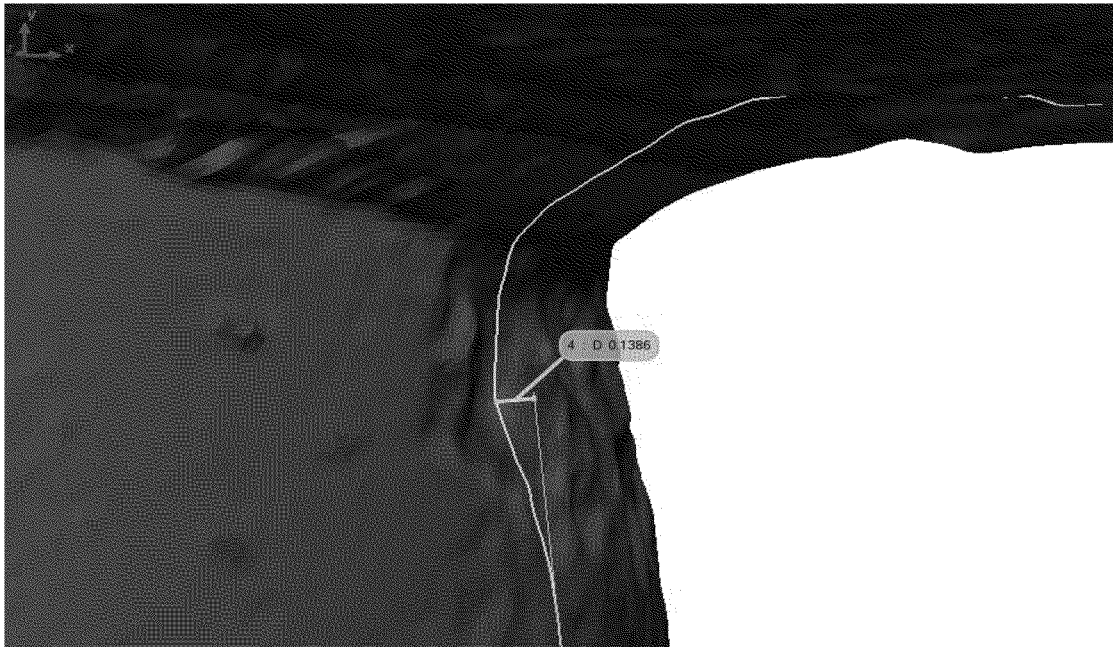


Creaform Laser Scanner Data for Drip Pot to saddle weld

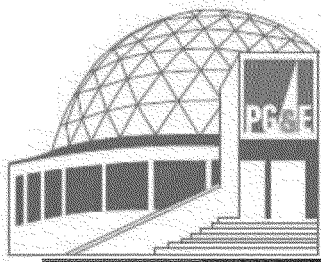


San carlos l-147 mp 0.52.stl

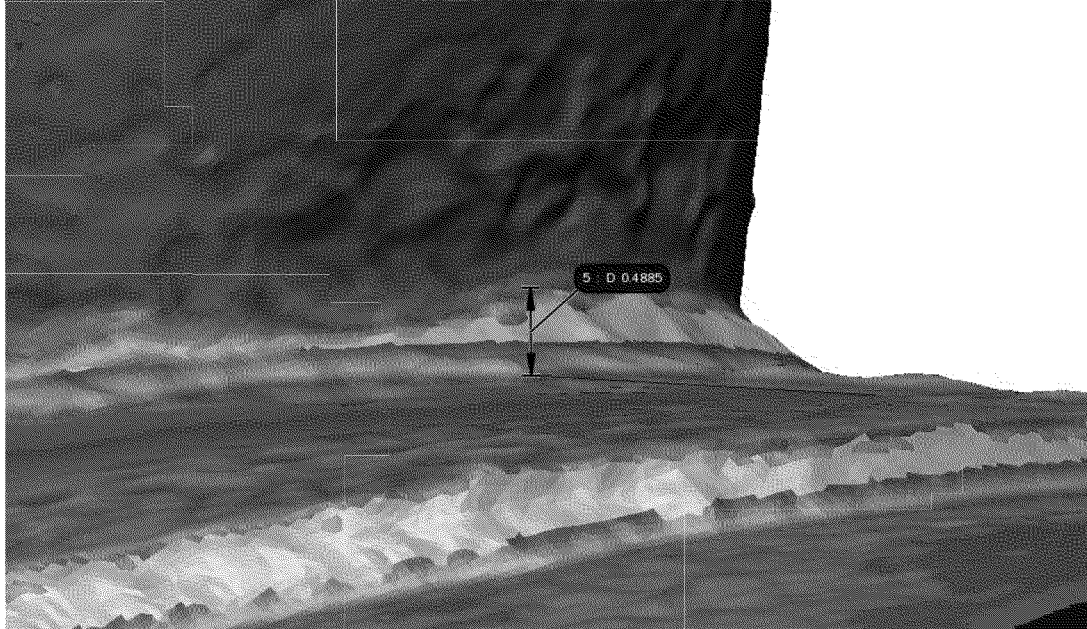
Over View of L-147 MP 0.52 drip pot and weld pad



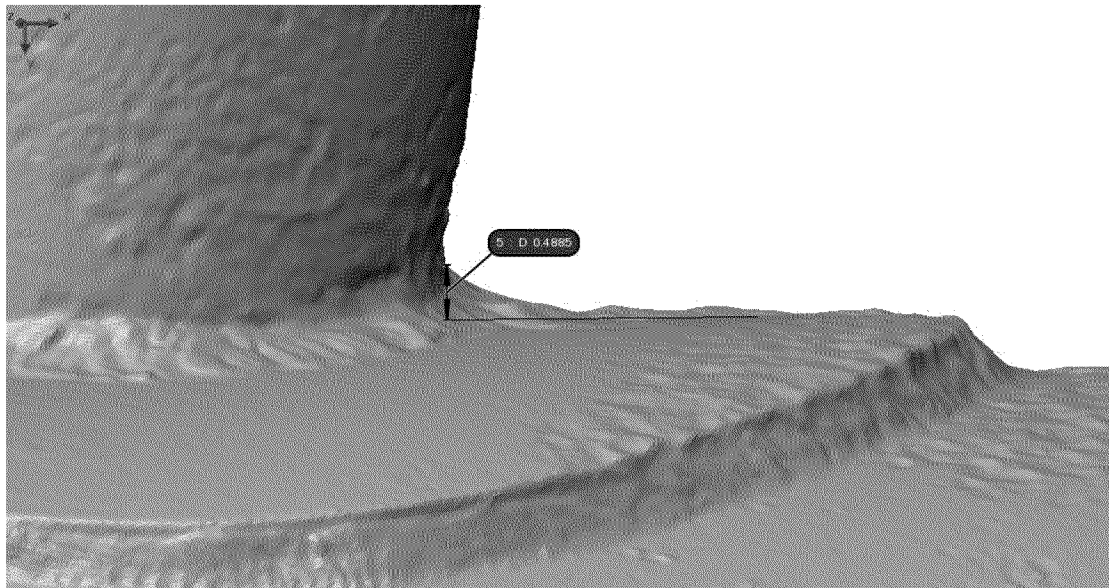
View of deepest corrosion pit



Creaform Laser Scanner Data for Drip Pot to saddle weld



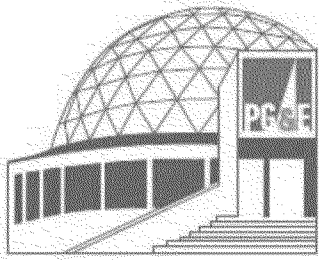
Estimated weld leg size



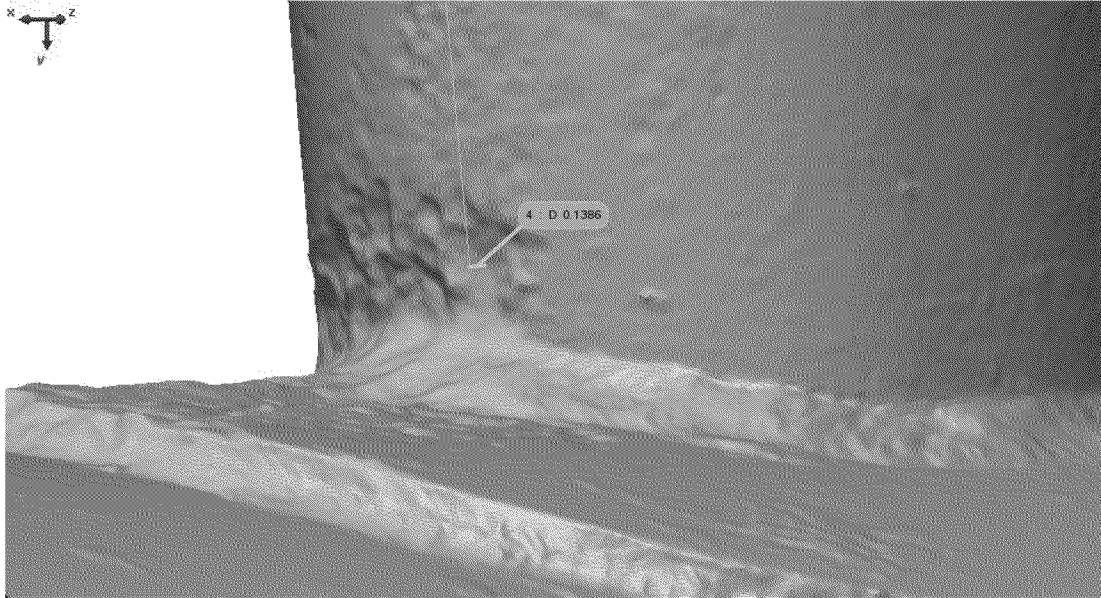
Estimated weld leg size, without color map

ATS Report #:413.61-13.390
Report Revision #0

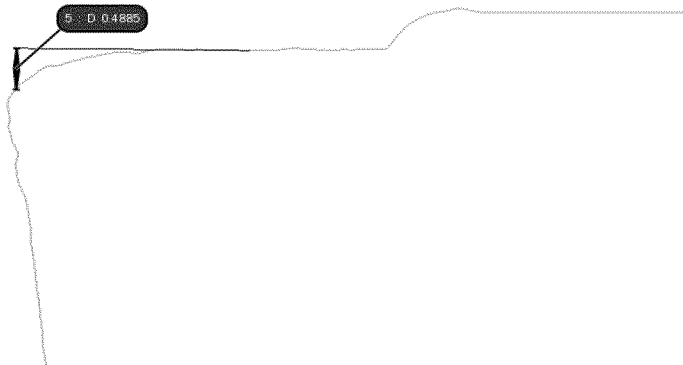
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Creaform Laser Scanner Data for Drip Pot to saddle weld



View of deepest corrosion pit, without color map



Cross-section view of estimated weld leg size

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ATS Report #:413.61-13.390
Report Revision #0

Form H: Direct Examination Data Sheet - Page 1 of 10

| | | | | | |
|------------------------------------|--------------------------|-------------------------------|--|------------|--|
| <u>DA/ILI</u> | | <u>DA</u> | | <u>ILI</u> | |
| Route Number: L-147 | N-Segment: L-147 | ILI Log Distance: N/A | | | |
| Examination Date: 10/15/2013 | IMA Number: N/A | RMP-11 Ref. Section: N/A | | | |
| Mile Point: 0.52 | N/A | Reference Girth Weld: N/A | | | |
| Examination Performed By: Redacted | Region Number: _____ | Distance From Girth Weld: N/A | | | |
| PG&E Project Manager: _____ | Subregion# (ICDA): _____ | | | | |
| Approved By: _____ | Stationing: N/A | | | | |
| Order Number: 4151987 | | | | | |

| | | | | | | | |
|------------------------------------|--|--|--------------------------------|--|--------------------------------|---------------------------------|--|
| <u>Excavation Priority:</u> | | | | <u>Excavation Reason</u> | | | |
| <input type="checkbox"/> Immediate | <input type="checkbox"/> Scheduled | <input type="checkbox"/> 1 Year | <input type="checkbox"/> Other | <input type="checkbox"/> ECDA | <input type="checkbox"/> ILI | <input type="checkbox"/> Recoat | |
| <input type="checkbox"/> Monitor | <input type="checkbox"/> Effectiveness | <input checked="" type="checkbox"/> ICDA | | <input checked="" type="checkbox"/> ICDA | <input type="checkbox"/> Other | <u>N/A</u> | |

If practical, take P/S or CIS reads before excavation: N/A

Excavation Details: Centerline on GPS Coordinates (Based on GIS): _____

Planned Inspection Length (Ft.): 8'

Actual Inspection Length (Ft.): 8'

Centerline on GPS Coordinates (Uncorrected Field Measurement): _____ GPS File Name: L-147 MP 0.52

Northing: 4147701.664 m

Easting: 562906.949 m

Centerline on GPS Coordinates (Corrected Field Measurement): _____

Nominal Wall Thickness: .312"

Nominal Pipe Diameter: 24"

1.0 Data Before Coating Removal

1.1 Native Soil Type: Clay Rock Sand Loam Wet Other _____

1.1a Backfill Material Found Sand Slurry Native

Depth of Cover (Ft.): None this inspection was done above ground

Comments: This inspection was done on a span of pipe that is exposed across a creek.

1.2 Coating Type: HAA Somatic Plastic Tape Wax Tape FBE Powercrete

Bare/None Paint Other: N/A Comments: this is a thick asphalt coating.

Coating Thickness (Inches): 0.523 Number of Layers: 1

1.3 Holiday Testing Performed?: Yes No Voltage Used: N/A Map Location of Holidays Below.

Device Used: Coil Wet Sponge Comments: The coating was removed when I arrived on site.

1.4 Pipe-to-Soil Potentials in Ditch (-mV): US: 1,057 DS: 1,066

Comments: These potentials are above the Nace standard of -850 mV, these readings were taken with a CSE.

1.5 Soil Resistivity in Ditch (Ω-cm):

Method: 4-Pin 4-pin not performed Soil Box 1.6X10,000=1,000

1.6 Soil Sample Location: Comments: There was no soil sample taken.

1.7 Ground Water Present?: Yes No Sample(s) Collected?: Yes No Sample pH: N/A

Comments: _____

1.8 Coating Condition: Good - Adhered to Pipe Fair - Coating Partially Disbonded or Degraded

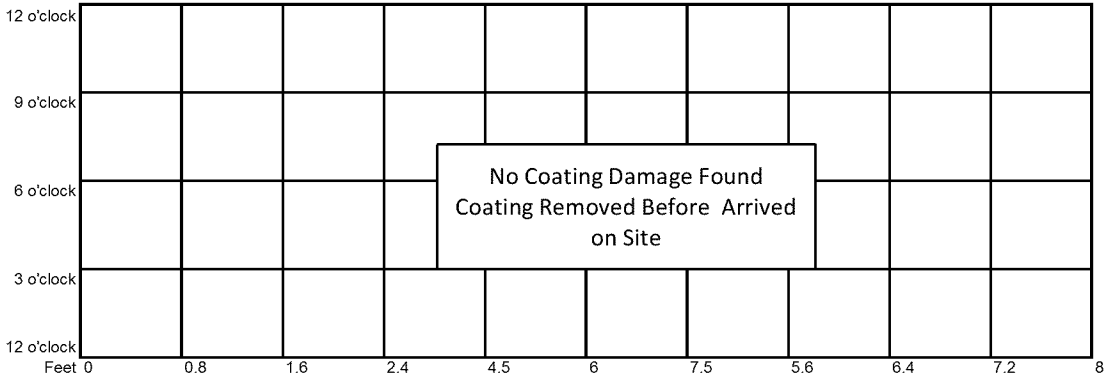
Poor - Coating Significantly Disbonded or Missing

Comments: Coating was removed before Mears Technician arrived on site 10-15-13

1.9 Map of Coating Degradation*: Zero Reference Point: U/S Edge of coating removal

*Note any calcareous deposit locations

Flow \longrightarrow



Form H: Direct Examination Data Sheet - Page 2 of 10

DA/ILI
 Route Number: L-147
 Examination Date: 10/15/2013
 Mile Point: 0.52
 Examination Performed By: Redacted
 PG&E Project Manager: Redacted
 Approved By: Redacted
 Order Number: 4151987

DA
 N-Segment: L-147
 IMA Number: N/A
 Region Number: _____
 Subregion # (ICDA): _____
 Stationing: N/A

ILI
 ILI Log Distance: N/A
 RMP-11 Ref. Section: N/A
 Reference Girth Weld: N/A
 Distance From Girth Weld: N/A

1.10 Photos Taken?*: Yes No
 *See Photo Log for additional information.

1.11 Coating Sample Taken?: Yes No Location of Sample: There was no Coating sample taken at this site.

1.12 Liquid Underneath Coating?: Yes No If Yes, pH of Liquid: N/A Coating was removed before arrival to site.

1.13 Corrosion Product Present?: Yes No If Yes, Was Sample Taken?: Yes No
 Comments: The only corrosion product found was removed with a 4" angle grinder with a wire wheel.

1.14 Soil pH (Sb Electrode): Upstream: 5.5 Downstream: 5.5

2.0 Data After Coating Removal

2.1 Pipe Temperature (°F): Ambient Measured Pipe Diameter (In.): 24.11

2.2 Weld Seam Type: DSAW SSAW ERW SMLS
 Spiral Lap Flash AO Smith If can't determine, visually perform macroetch to locate & identify type (see Table 5.7.3, Element 2.2)

2.3 Girth Weld Coordinates:
 Northing: N/A
 Easting: N/A
 Elevation: N/A
 Weld Clock Position: 2:00

2.4 Damage Found:
 Corrosion Damage? Yes No Mechanical Damage? Yes No
 Other Damage: There was no oter dmage that was found during the inspection

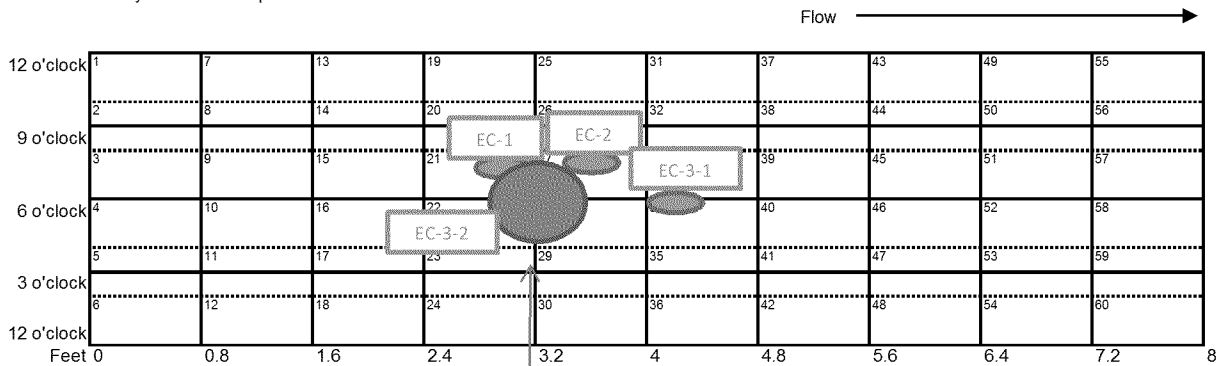
2.5 UT Wall Thickness Measurements: TDC: 0.332" / 1 O'clock: 0.326" / 2 O'clock: 0.321" / 3 O'clock: 0.320" /
 Main Line / Drip Line 4 O'clock: 0.327" / 5 O'clock: 0.324" / 6 O'clock: 0.332" / 7 O'clock: 0.328" /
 8 O'clock: 0.326" / 9 O'clock: 0.331" / 10 O'clock: 0.329" / 11 O'clock: 0.332" /

2.5a Nominal Wall Thickness: .312"
 UT Wall Thickness Grid @ 6:00 is required. Be sure to attach grid to Form H electronically. See page 6 of 10.

2.6 Wet Fluorescent Mag. Part. Is Required. Comments: WFMT not performed.
 Were there any linear indications? Yes No If Yes, attach NDE report electronically as part of the Form H. Report to include black light and white light photos of indications.

2.7 Take Photos to Document Corrosion and Other Anomalies*
 *See Photo Log for additional information.

2.8 Overview Map of Corroded Area*
 *See Pit Depth Measurement Grid for additional information **Zero Reference Point:** U/S Edge of coating removal
 *Note any calcareous deposits.



Drip Pot
 EC-3-2 is the entire circumference of the 6" Dia Drip Pot

Form H: Direct Examination Data Sheet - Page 3 of 10

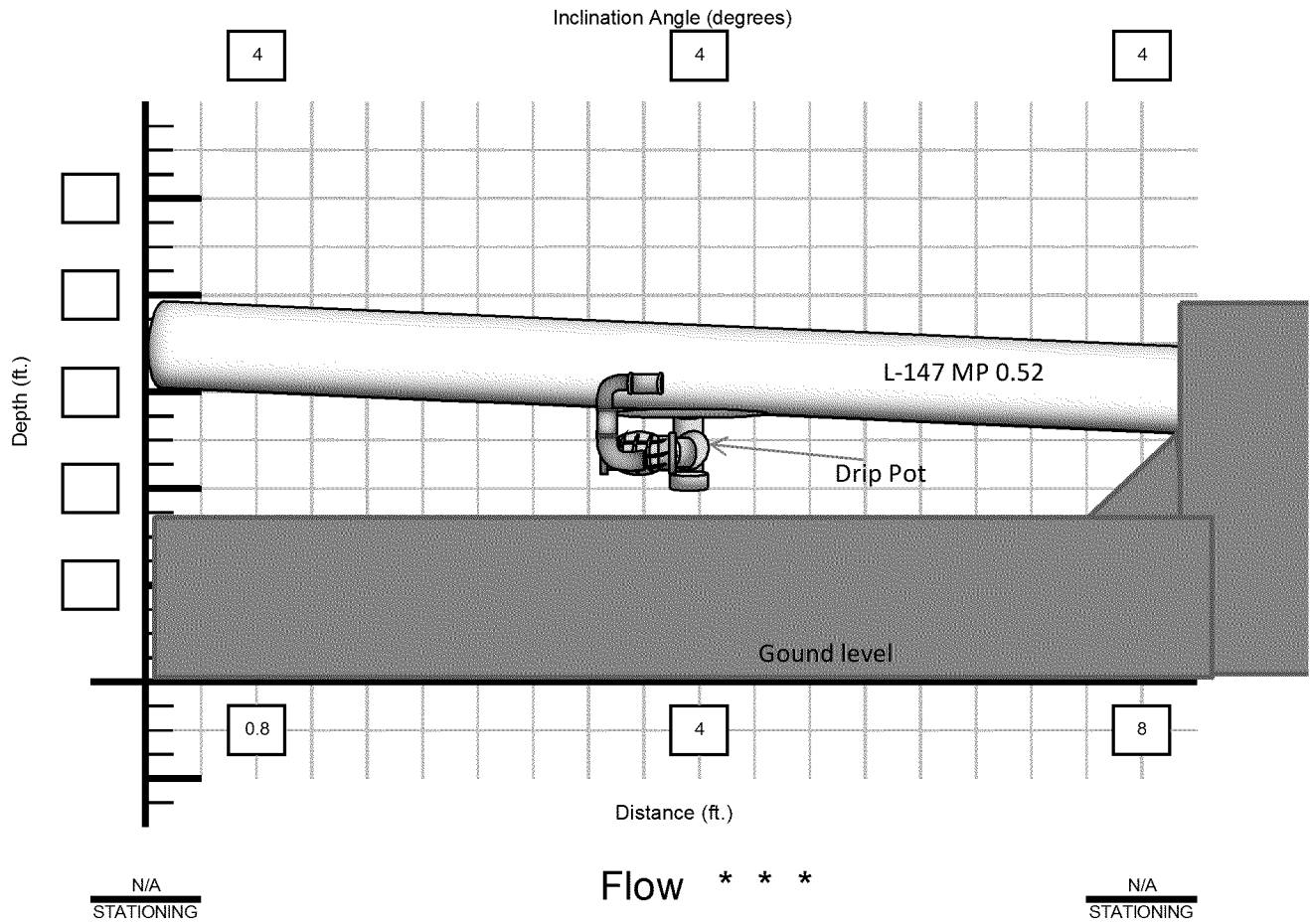
DA/ILI
Route Number: L-147
Examination Date: 10/15/2013
Mile Point: 0.52
Examination Performed By: Redacted
PG&E Project Manager:
Approved By:
Order Number: 4151987

DA
N-Segment: L-147
IMA Number: N/A
N/A
Region Number:
Subregion # (ICDA):
Stationing: N/A

ILI
ILI Log Distance: N/A
RMP-11 Ref. Section: N/A
Reference Girth Weld: N/A
Distance From Girth Weld: N/A

Excavation Drawing:

At minimum draw pipe elevation profile and indicate stationing of 1) low point and 2) critical inclination angle.
Place an arrow on the drawing indicating direction of gas flow in the region(s). Other labels may also be added (e.g. "to Station").



NOTES: (Record stationing and names of nearby landmarks such as creeks and roads. Provide any additional information that may help in spatially positioning pipe):

This site was located in a forest region of San Carlos Redacted

EXTERNAL PIT DEPTH MEASUREMENT GRID SHEETS

DA/ILI
 Route Number: L-147
 Examination Date: 10/15/2013
 Mile Point: 0.52
 Examination Performed By: Redacted
 PG&E Project Manager: _____
 Approved By: _____
 Order Number: 4151987

DA
 N-Segment: L-147
 IMA Number: N/A
 N/A
 Region Number: _____
 Subregion# (ICDA): _____
 Stationing: N/A

ILI
 ILI Log Distance: N/A
 RMP-11 Ref. Section: N/A
 Reference Girth Weld: N/A
 Distance From Girth Weld: N/A

Grid Size = 1 Inch x 1 Inch (specify grid size)
 Clock Position (specify below)

N/A Readings are readings that were unattainable due to Welds

Anomaly #: EC-1, EC-2, EC-3-1

Grid #: _____

| EC-1 | | | | | | EC-2 | | | | | |
|--------|-------|-------|-------|---|-------|-------|--|-------|-------|-------|-------|
| 1 | 2 | 3 | | | | A | 1 | 2 | 3 | 4 | |
| A | 0.081 | 0.057 | 0.005 | | | | A | 0.009 | 0.000 | 0.012 | 0.000 |
| B | 0.075 | 0.058 | 0.013 | | | | B | 0.005 | 0.020 | 0.028 | 0.042 |
| C | 0.049 | 0.043 | 0.016 | | | | C | 0.000 | 0.024 | 0.029 | 0.003 |
| D | 0.025 | 0.022 | 0.009 | Maximum 24.9% Wall Loss Due to External Corrosion EC-1 | | | | | | | |
| | | | | | | | | | | | |
| EC-3-1 | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | | | | | | |
| A | 0.000 | 0.010 | 0.027 | 0.030 | 0.000 | N/A | | | | | |
| B | 0.005 | 0.012 | 0.030 | 0.049 | 0.033 | 0.022 | | | | | |
| C | 0.000 | 0.017 | 0.039 | N/A | 0.031 | 0.020 | | | | | |
| D | 0.000 | 0.013 | 0.050 | 0.023 | 0.008 | 0.057 | EC3-1 is on the main line and Tie-in plate of drip line. It interacts with EC 3-2 on the | | | | |
| E | 0.000 | 0.005 | 0.018 | 0.065 | 0.058 | 0.058 | | | | | |
| F | 0.025 | 0.049 | 0.058 | N/A | L/S | L/S | | | | | |
| G | 0.024 | 0.000 | 0.062 | 0.012 | 0.048 | 0.073 | | | | | |
| H | 0.006 | 0.008 | 0.012 | N/A | 0.053 | 0.048 | | | | | |
| I | 0.002 | 0.014 | 0.023 | N/A | 0.057 | 0.030 | | | | | |

EXTERNAL PIT DEPTH MEASUREMENT GRID SHEETS

DA/ILI
 Route Number: L-147
 Examination Date: 10/15/2013
 Mile Point: 0.52
 Examination Performed By: Redacted
 PG&E Project Manager: Redacted
 Approved By: Redacted
 Order Number: 4151987

DA
 N-Segment: L-147
 IMA Number: N/A
 N/A
 Region Number: _____
 Subregion# (ICDA): _____
 Stationing: N/A

ILI
 ILI Log Distance: N/A
 RMP-11 Ref. Section: N/A
 Reference Girth Weld: N/A
 Distance From Girth Weld: N/A

Grid Size = _____ Inch x _____ Inch (specify grid size)
 Clock Position (specify below)

Anomaly #: EC-3-2

Grid #: _____

EC-3-2

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A | 0.005 | 0.000 | 0.009 | 0.005 | 0.002 | 0.000 | 0.000 | 0.010 | 0.008 | 0.009 | 0.012 | 0.021 | 0.018 | 0.007 | 0.015 | 0.015 | 0.008 | 0.014 | 0.019 | 0.010 | 0.005 |
| B | 0.004 | 0.003 | 0.003 | 0.003 | 0.002 | 0.016 | 0.004 | 0.006 | 0.014 | 0.021 | 0.020 | 0.019 | 0.007 | 0.018 | 0.019 | 0.015 | 0.004 | 0.030 | 0.006 | 0.007 | 0.035 |
| C | 0.001 | 0.003 | 0.008 | 0.000 | 0.000 | 0.000 | 0.000 | 0.003 | 0.014 | 0.005 | 0.007 | 0.000 | 0.000 | 0.026 | 0.028 | 0.005 | 0.006 | 0.012 | 0.010 | 0.036 | 0.045 |
| D | 0.000 | 0.000 | 0.000 | 0.013 | 0.016 | 0.007 | 0.009 | 0.018 | 0.022 | 0.015 | 0.000 | 0.005 | 0.004 | 0.011 | 0.016 | 0.019 | 0.039 | 0.045 | 0.000 | 0.000 | 0.000 |
| E | 0.000 | 0.000 | 0.000 | 0.000 | 0.027 | 0.008 | 0.015 | 0.010 | 0.034 | 0.014 | 0.005 | 0.000 | 0.000 | 0.010 | 0.010 | 0.042 | 0.058 | 0.039 | 0.000 | 0.000 | 0.000 |
| F | 0.000 | 0.000 | 0.000 | 0.006 | 0.015 | 0.014 | 0.002 | 0.011 | 0.000 | 0.015 | 0.000 | 0.006 | 0.035 | 0.051 | 0.033 | 0.046 | 0.053 | 0.042 | 0.000 | 0.000 | 0.000 |
| G | 0.000 | 0.000 | 0.000 | 0.000 | 0.005 | 0.013 | 0.004 | 0.005 | 0.005 | 0.003 | 0.000 | 0.004 | 0.033 | 0.034 | 0.025 | 0.031 | 0.026 | 0.021 | 0.000 | 0.000 | 0.000 |
| H | 0.000 | 0.000 | 0.000 | 0.003 | 0.006 | 0.007 | 0.010 | 0.010 | 0.006 | 0.003 | 0.004 | 0.028 | 0.034 | 0.033 | 0.032 | 0.037 | 0.017 | 0.022 | 0.000 | 0.000 | 0.000 |
| I | 0.042 | 0.018 | 0.020 | 0.009 | 0.009 | 0.022 | 0.005 | 0.000 | 0.016 | 0.031 | 0.034 | 0.016 | 0.042 | 0.032 | 0.026 | 0.035 | 0.026 | 0.033 | 0.062 | 0.033 | 0.028 |
| J | | | | | | | | | | | | | | | | | | | | | |
| K | Maximum 22.1 % Wall Loss Due to External Corrosion EC-3-2 | | | | | | | | | | EC 3-2 on the drip line, covers the full circumference, and interacts with EC 3-1 | | | | | | | | | | |
| L | | | | | | | | | | | | | | | | | | | | | |
| M | | | | | | | | | | | | | | | | | | | | | |
| N | | | | | | | | | | | | | | | | | | | | | |
| O | | | | | | | | | | | | | | | | | | | | | |
| P | | | | | | | | | | | | | | | | | | | | | |
| Q | | | | | | | | | | | | | | | | | | | | | |
| R | | | | | | | | | | | | | | | | | | | | | |
| S | | | | | | | | | | | | | | | | | | | | | |
| T | | | | | | | | | | | | | | | | | | | | | |
| U | | | | | | | | | | | | | | | | | | | | | |
| V | | | | | | | | | | | | | | | | | | | | | |
| W | | | | | | | | | | | | | | | | | | | | | |
| X | | | | | | | | | | | | | | | | | | | | | |

INTERNAL CORROSION PIT DEPTH GRID

DA/ILI
 Route Number: L-147
 Examination Date: 10/15/2013
 Mile Point: 0.52
 Examination Performed By: Redacted
 PG&E Project Manager: Redacted
 Approved By: Redacted
 Order Number: 4151987

DA
 N-Segment: L-147
 IMA Number: N/A
 N/A
 Region Number: _____
 Subregion# (ICDA): _____
 Stationing: N/A

LI
 ILI Log Distance: N/A
 RMP-11 Ref. Section: N/A
 Reference Girth Weld: N/A
 Distance From Girth Weld: N/A

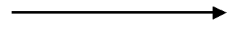
Grid Size = 1 Inch x 1 Inch
 Clock Position (specify below)

2' from U/S Edge

UT Data in Inches

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A | 0.334 | 0.335 | 0.333 | 0.337 | 0.337 | 0.337 | 0.332 | 0.333 | 0.332 | 0.331 | 0.330 | 0.331 |
| B | 0.331 | 0.334 | 0.333 | 0.334 | 0.335 | 0.335 | 0.335 | 0.333 | 0.333 | 0.332 | 0.332 | 0.331 |
| C | 0.334 | 0.334 | 0.337 | 0.336 | 0.334 | 0.336 | 0.337 | 0.333 | 0.335 | 0.335 | 0.333 | 0.336 |
| D | 0.333 | 0.334 | 0.334 | 0.333 | 0.333 | 0.334 | 0.333 | 0.334 | 0.334 | 0.333 | 0.334 | 0.332 |
| E | 0.333 | 0.332 | 0.333 | 0.333 | 0.332 | 0.333 | 0.334 | 0.334 | 0.333 | 0.334 | 0.333 | 0.332 |
| F | 0.333 | 0.333 | 0.333 | 0.332 | 0.335 | 0.337 | 0.334 | 0.333 | 0.332 | 0.333 | 0.333 | 0.331 |
| G | 0.337 | 0.335 | 0.334 | 0.333 | 0.335 | 0.331 | 0.330 | 0.329 | 0.331 | 0.331 | 0.333 | 0.329 |
| H | 0.333 | 0.332 | 0.333 | 0.331 | 0.332 | 0.336 | 0.332 | 0.332 | 0.332 | 0.333 | 0.332 | 0.330 |
| I | 0.331 | 0.330 | 0.331 | 0.334 | 0.331 | 0.331 | 0.332 | 0.332 | 0.332 | 0.331 | 0.331 | 0.330 |
| J | 0.331 | 0.329 | 0.330 | 0.330 | 0.331 | 0.331 | 0.330 | 0.331 | 0.330 | 0.329 | 0.329 | 0.330 |
| K | 0.329 | 0.327 | 0.333 | 0.335 | 0.335 | 0.333 | 0.333 | 0.333 | 0.333 | 0.332 | 0.331 | 0.329 |
| L | 0.332 | 0.331 | 0.330 | 0.334 | 0.330 | 0.330 | 0.332 | 0.331 | 0.330 | 0.331 | 0.332 | 0.330 |

6:00



INTERNAL CORROSION GRID
1 of 1

PHOTO LOG

DA/ILI
 Route Number: L-147
 Examination Date: 10/15/2013
 Mile Point: 0.52
 Examination Performed By: Redacted
 PG&E Project Manager:
 Approved By:
 Order Number: 4151987

DA
 N-Segment: L-147
 IMA Number: N/A
 N/A
 Region Number:
 Subregion# (ICDA):
 Stationing: N/A

ILI
 ILI Log Distance: N/A
 RMP-11 Ref. Section: N/A
 Reference Girth Weld: N/A
 Distance From Girth Weld: N/A

| PHOTO NO. | LOCATION | DESCRIPTION | COMMENTS |
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|---|---|--|
| <p>DA/ILI Route Number: L-147 Examination Date: 10/15/2013 Mile Point: 0.52 Examination Performed By: Redacted PG&E Project Manager: Redacted Approved By: Redacted Order Number: 4151987</p> | <p>DA N-Segment: L-147 IMA Number: N/A Region Number: Subregion # (ICDA): Stationing: N/A</p> | <p>ILI ILI Log Distance: N/A RMP-11 Ref. Section: N/A Reference Girth Weld: N/A Distance From Girth Weld: N/A</p> |
|---|---|--|

3.0 Recoat Data

3.1 Sandblast Media: _____ Anchor Profile Measurement: _____ mils

3.2 Pipe Recoated With:

Powercrete J Wax Tape Bar-Rust 235 Dev Grip 238 Dev Tar 247 Protal 7200 PE Tape

3.3 For Epoxy Coating Systems, Record Environmental Condition:

Air Temperature: °F _____ Dew Point: °F _____
 Pipe Temperature: °F _____ Relative Humidity: % _____
 Time of Day: _____

3.4 Repair Coating Hardness (If ARC Coating): _____

3.5 Measured Coating Thickness: 3:00 - 0 - 0 mils 6:00 - _____ 9:00 - _____ 12:00 - _____

Holiday Tested?: Yes No

Device Used: Coil Wet Sponge Voltage Used: _____ Repair All Holidays.

3.6 Coupon Test Station Installed?: Yes No ETS Installed?: Yes No

If Yes, Date Installed: _____

Surface Configuration: Fink G-5 Box Carsonite Other: _____

3.7 Backfill Material: Native Imported Sand Other: _____

Coating Protections?: Yes No

If Yes, Check One: Rockguard Tuff-N-Nuff PipeSaver Other: _____

3.8 Pipe-to-Soil Readings Over Bell Hole After Backfill: _____

*If specified, a CIS should be done for approximately 100' on either side of the bell hole. Attach data.

Comments: The Pipe-to-Soil was taken with a CSE.

3.9 Attach site sketch of excavation site.

4.0 Repair Data

4.1 Repair Made: Yes No 4.1 Number of Repairs Made: _____

4.3 Repair Type: Metallic Sleeve Non Metallic Sleeve Replace Can Filler Metal Other

4.4 Damage Repaired: Corrosion Mechanical Other

Misc. Comments/Information: This site is located in San Carlos, California. This is a soil excavation the pipe is spanning a creek. This pipe is a 24" diameter This pipe has a SSAW LSW verified by PG&E ATS RT crew. This is a limited Form-H because the coating was removed prior to the arrival Mears Tech and the main focus is the corrosion measurement. This PG&E project is an ICDA, PG&E was looking for Internal corrosion in the bottom of the Carrier pipe. There was none found. This pipe was not Media Blasted. There was some external corrosion that was found on the Bottom of the pipe at the 6:00 where there was a drip pot coming off the bottom of the line at 35" from the U/S Edge of coating removal. The drip pot is 13" long and has a 3" cap at the end of that. 5" down from the weld of the Drip pot and the carrier pipe there is a 2" pipe coming out of the drip pot, this pipe goes into a valve and then a 90 degree elbow up to a straight pipe then a 90 degree elbow that goes North into a Vacking fitting. There were 4 Corrosion cells that were manually gridded. The most severe of these corrosion cells was EC-1 with a depth of 081" or 24.9% wall loss. EC-3 was split into two corrosion cells (EC 3-1 and EC 3-2) for grid measurement purposes. EC-3 interacts with the main line, tie-in plate, and the full circumference of the drip line.

Excavation size: N/A
 Mears Job Number: N/A

