

## **Section 6 Final Test Assessment**

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The SENTRY transport package did not lose or disperse radioactive material and did not have external radiation dose rates exceeding 10-mSv/h (1-rem/h) at 1 m (40 in) from the external surface of the package after being subjected to the HAC test sequence identified in 10 CFR Part 71.

The results and assessments in this report confirm the SENTRY transport package in any of its described configurations meet the hypothetical accident conditions test requirements of test plan 180, 10 CFR Part 71, and IAEA TS-R-1 1996.



## Appendix A: Radiation Profile Results

| TP180A Radiation Profile Inspection   |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
|---|----------------------------|----------------------|-------------------|----------------------------|-------------------|---|--|--|--|--|--|----------|----------------------------|--|--|----------------------------|--|--|------------|----------------------|-------------------|------------|-------------------|----------------|-----|----|------|----|----|----|----|-------|----|------|--|-----|----|-----|-------|----|------|--|-----|----|----|------|----|------|--|-----|----|-----|------|----|------|--|-----|----|-----|--------|----|------|--|-----|----|-----|
| Initial Build Profile Results   |                            |                      |                   |                            |                   | Post Test Profile Results   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| <div style="display: flex; justify-content: space-between;"> <div style="text-align: left;"> <p><b>QSA GLOBAL</b></p> </div> <div style="text-align: right;"> <p><b>SHIELDING PROFILE AND INSPECTION FORM</b><br/>(S717)<br/>P-Q-180A-2</p> </div> </div>   |                            |                      |                   |                            |                   | <div style="display: flex; justify-content: space-between;"> <div style="text-align: left;"> <p><b>QSA GLOBAL</b></p> </div> <div style="text-align: right;"> <p><b>SHIELDING PROFILE AND INSPECTION FORM</b><br/>(S717)<br/>P-Q-180A-2</p> </div> </div> |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Sheet 1 of 1  |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| <p><b>Shield Data</b></p> <p>Model: <u>96010-330</u>   Shield: <u>TP180A</u>   Buffers: <u>Co-60</u>   Max. Capacity: <u>330 Ci</u><br/>         Shield P/N: <u>86001-330</u>   Shield Bore: <u>C586-A06</u>   Lot: <u>07/4/00302</u></p>   |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| <p><b>Profile Process Data</b></p> <p>Source Model: <u>924-13</u>   Source Ser: <u>0836122</u>   Buffers: <u>Co-60</u>   Activity: <u>324-1 Ci</u><br/>         Survey Inst: <u>6500</u>   Serial #: <u>1863</u>   Data Cal: <u>4/21/07</u>   Date Test: <u>3/28/10</u><br/>         Survey Inst: <u>416</u>   Serial #: <u>NA</u>   Data Cal: <u>NA</u>   Date Test: <u>NA</u><br/>         Test Probe: <u>SP270</u>   Serial #: <u>00542</u>   Capacity Correction Factor: <u>1.02</u><br/>         Capacity Correction Factor: <u>1.63</u></p>   |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Location</th> <th colspan="3">Measured Data Rate (uR/hr)</th> <th colspan="3">Adjusted Data Rate (uR/hr)</th> </tr> <tr> <th>At Surface</th> <th>Surface Corr. Factor</th> <th>At 30 Cm (Note 2)</th> <th>At Surface</th> <th>At 30 Cm (Note 2)</th> <th>At 0m (Note 2)</th> </tr> </thead> <tbody> <tr> <td>Top</td> <td>15</td> <td>1.09</td> <td>NA</td> <td>15</td> <td>NA</td> <td>.5</td> </tr> <tr> <td>Right</td> <td>55</td> <td>1.06</td> <td></td> <td>1.1</td> <td>60</td> <td>1.1</td> </tr> <tr> <td>Front</td> <td>35</td> <td>1.06</td> <td></td> <td>1.0</td> <td>38</td> <td></td> </tr> <tr> <td>Left</td> <td>45</td> <td>1.06</td> <td></td> <td>1.2</td> <td>49</td> <td>1.2</td> </tr> <tr> <td>Rear</td> <td>30</td> <td>1.06</td> <td></td> <td>1.3</td> <td>32</td> <td>1.3</td> </tr> <tr> <td>Bottom</td> <td>25</td> <td>1.09</td> <td></td> <td>1.0</td> <td>23</td> <td>1.0</td> </tr> </tbody> </table> <p>Acceptance Criteria: <u>&lt;200</u> NA <u>&lt;5.0</u></p> <p>Results (Check one): <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject</p> |                            |                      |                   |                            |                   |   |  |  |  |  |  | Location | Measured Data Rate (uR/hr) |  |  | Adjusted Data Rate (uR/hr) |  |  | At Surface | Surface Corr. Factor | At 30 Cm (Note 2) | At Surface | At 30 Cm (Note 2) | At 0m (Note 2) | Top | 15 | 1.09 | NA | 15 | NA | .5 | Right | 55 | 1.06 |  | 1.1 | 60 | 1.1 | Front | 35 | 1.06 |  | 1.0 | 38 |    | Left | 45 | 1.06 |  | 1.2 | 49 | 1.2 | Rear | 30 | 1.06 |  | 1.3 | 32 | 1.3 | Bottom | 25 | 1.09 |  | 1.0 | 23 | 1.0 |
| Location  | Measured Data Rate (uR/hr) |                      |                   | Adjusted Data Rate (uR/hr) |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
|   | At Surface                 | Surface Corr. Factor | At 30 Cm (Note 2) | At Surface                 | At 30 Cm (Note 2) | At 0m (Note 2)  |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Top   | 15                         | 1.09                 | NA                | 15                         | NA                | .5  |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Right   | 55                         | 1.06                 |                   | 1.1                        | 60                | 1.1   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Front   | 35                         | 1.06                 |                   | 1.0                        | 38                |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Left  | 45                         | 1.06                 |                   | 1.2                        | 49                | 1.2   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Rear  | 30                         | 1.06                 |                   | 1.3                        | 32                | 1.3   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Bottom  | 25                         | 1.09                 |                   | 1.0                        | 23                | 1.0   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| <p>Inspector: <u>[Signature]</u> Date: <u>3/24/10</u> NCR # _____</p> <p>Comments:<br/><u>Test was good.</u></p> <p>Notes:<br/>1. Refer to P-Q-180A-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or P-Q-180A-2, Shield Profile Worksheet for One meter acceptance limits.<br/>2. The three readings are only required when specifically requested.<br/>3. Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.<br/>4. Attach instrument calibration records for instrument uncertainty.</p>   |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| P-Q-180A-2, rev. 3      Page 1 of 1      9 March 2009   |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| <p><b>Shield Data</b></p> <p>Model: <u>96010-330</u>   Shield: <u>TP180A</u>   Buffers: <u>Co-60</u>   Max. Capacity: <u>330 Ci</u><br/>         Shield P/N: <u>86001-330</u>   Shield Bore: <u>C586-A06</u>   Lot: <u>07/4/00302</u></p>   |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| <p><b>Profile Process Data</b></p> <p>Source Model: <u>924-13</u>   Source Ser: <u>0836122</u>   Buffers: <u>Co-60</u>   Activity: <u>324-1 Ci</u><br/>         Survey Inst: <u>6500</u>   Serial #: <u>1863</u>   Data Cal: <u>4/21/07</u>   Date Test: <u>3/28/10</u><br/>         Survey Inst: <u>416</u>   Serial #: <u>NA</u>   Data Cal: <u>NA</u>   Date Test: <u>NA</u><br/>         Test Probe: <u>SP270</u>   Serial #: <u>00542</u>   Capacity Correction Factor: <u>1.02</u><br/>         Capacity Correction Factor: <u>1.63</u></p>   |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
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| Location  | Measured Data Rate (uR/hr) |                      |                   | Adjusted Data Rate (uR/hr) |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
|   | At Surface                 | Surface Corr. Factor | At 30 Cm (Note 2) | At Surface                 | At 30 Cm (Note 2) | At 0m (Note 2)  |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Top   | 17                         | 1.09                 | NA                | 17                         | NA                | .3  |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Right   | 36                         | 1.06                 |                   | 1.1                        | 64                | 1.0   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Front   | 18                         | 1.06                 |                   | 1.0                        | 32                | .8  |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Left  | 16                         | 1.06                 |                   | 1.2                        | 29                | .8  |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Rear  | 12                         | 1.06                 |                   | 1.3                        | 21                | .8  |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| Bottom  | 13                         | 1.09                 |                   | 1.0                        | 24                | .5  |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| <p>Inspector: <u>[Signature]</u> Date: <u>3/10/10</u> NCR # _____</p> <p>Comments:<br/><u>All but bottom 4 inch readings are less than 200 uR/hr as noted.</u><br/> <u>Bottom 4 inch reading is less than 200 uR/hr.</u><br/> <u>"Post HAC-Test Result"</u></p> <p>Notes:<br/>1. Refer to P-Q-180A-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or P-Q-180A-2, Shield Profile Worksheet for One meter acceptance limits.<br/>2. The three readings are only required when specifically requested.<br/>3. Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.<br/>4. Attach instrument calibration records for instrument uncertainty.</p>  |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |
| P-Q-180A-2, rev. 4      Page 1 of 1      27 January 2010  |                            |                      |                   |                            |                   |   |  |  |  |  |  |          |                            |  |  |                            |  |  |            |                      |                   |            |                   |                |     |    |      |    |    |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |    |      |    |      |  |     |    |     |      |    |      |  |     |    |     |        |    |      |  |     |    |     |



| TP180B Radiation Profile Inspection  |            |                             |                   |   |  |                              |                   |                   |                   |
|--|------------|-----------------------------|-------------------|---|--|------------------------------|-------------------|-------------------|-------------------|
| Initial Build Profile Results  |            |                             |                   |   | Post Test Profile Results  |                              |                   |                   |                   |
| <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: left;"> </div> <div style="text-align: right;"> <b>SHIELDING PROFILE AND INSPECTION FORM</b><br/>(SP1P)<br/>F-Q-180B-2                 </div> </div>   |            |                             |                   |   | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: left;"> </div> <div style="text-align: right;"> <b>SHIELDING PROFILE AND INSPECTION FORM</b><br/>(SP1P)<br/>F-Q-180B-2                 </div> </div> |                              |                   |                   |                   |
| Sheet 1 of 1   |            |                             |                   |   |  |                              |                   |                   |                   |
| Build Data   |            |                             |                   |   |  |                              |                   |                   |                   |
| Model: <u>Sankey 330</u>   |            | Serial: <u>TP180B</u>       |                   | Reference: <u>Co-60</u>                 |  | Max. Capacity: <u>330 Ci</u> |                   |                   |                   |
| Shield P/N: <u>26001-100</u>   |            | Shield S/N: <u>C613-A06</u> |                   | Lot: <u>02A0501008</u>                  |  |                              |                   |                   |                   |
| Profile Process Data   |            |                             |                   |   |  |                              |                   |                   |                   |
| Source Model: <u>924-13</u>  |            | Source S/N: <u>8277478</u>  |                   | Reference: <u>Co-60</u>                 |  | Activity: <u>318.1 Ci</u>    |                   |                   |                   |
| Survey Inst: <u>E600</u>   |            | Serial: <u>1963</u>         |                   | Date Cal: <u>3/24/09</u>                |  | Date Due: <u>3/24/10</u>     |                   |                   |                   |
| Inst. Probe: <u>HPA270</u>   |            | Serial: <u>00543</u>        |                   | Capacity Correction Factor: <u>1.06</u> |  |                              |                   |                   |                   |
| Measured Data Data Matrix  |            |                             |                   |   |  |                              |                   |                   |                   |
| Location   | At Surface | Surface Corr. Factor        | At 30 Cm (Note 2) | At 30 Cm (Note 2)                       | At 30 Cm (Note 2)  | At 30 Cm (Note 2)            | At 30 Cm (Note 2) | At 30 Cm (Note 2) | At 30 Cm (Note 2) |
| Top  | 19         | 1.07                        | NA                | .4                                      | 22   | NA                           | .4                |                   |                   |
| Right  | 50         | 1.06                        |                   | .9                                      | 56   |                              | 1.0               |                   |                   |
| Front  | 25         | 1.06                        |                   | .8                                      | 28   |                              | .9                |                   |                   |
| Left   | 40         | 1.06                        |                   | .9                                      | 45   |                              | 1.0               |                   |                   |
| Back   | 50         | 1.06                        |                   | 1.2                                     | 56   |                              | 1.3               |                   |                   |
| Bottom   | 25         | 1.07                        |                   | .4                                      | 29   |                              | .4                |                   |                   |
| Acceptance Criteria  |            |                             |                   |   |  |                              |                   |                   |                   |
| Results (Check one): <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject <input type="checkbox"/> NA <input type="checkbox"/> $\leq 1.0$  |            |                             |                   |   |  |                              |                   |                   |                   |
| Inspector: <u>[Signature]</u> Date: <u>3/8/09</u> NCR: <u>4</u>  |            |                             |                   |   |  |                              |                   |                   |                   |
| Comments: <u>1 inch reading on left backing of 2.2 m/s</u>   |            |                             |                   |   |  |                              |                   |                   |                   |
| <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>Refer to FQ-180B-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or FQ-180B-3, Shield Profile Worksheet for new meter acceptance tests.</li> <li>The 30 cm readings are only required when specifically requested.</li> <li>Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.</li> <li>Consult instrument calibration records for instrument uncertainty.</li> </ol> |            |                             |                   |   |  |                              |                   |                   |                   |
| FQ-180B-2, rev. 2      Page 1 of 1      29 March 2009  |            |                             |                   |   |  |                              |                   |                   |                   |

  

| TP180B Radiation Profile Inspection   |            |                             |                   |   |  |                              |                   |                   |                   |
|---|------------|-----------------------------|-------------------|---|--|------------------------------|-------------------|-------------------|-------------------|
| Initial Build Profile Results   |            |                             |                   |   | Post Test Profile Results  |                              |                   |                   |                   |
| <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: left;"> </div> <div style="text-align: right;"> <b>SHIELDING PROFILE AND INSPECTION FORM</b><br/>(SP1P)<br/>F-Q-180B-2                 </div> </div>  |            |                             |                   |   | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: left;"> </div> <div style="text-align: right;"> <b>SHIELDING PROFILE AND INSPECTION FORM</b><br/>(SP1P)<br/>F-Q-180B-2                 </div> </div> |                              |                   |                   |                   |
| Sheet 1 of 1  |            |                             |                   |   |  |                              |                   |                   |                   |
| Build Data  |            |                             |                   |   |  |                              |                   |                   |                   |
| Model: <u>Sankey 330</u>  |            | Serial: <u>TP180B</u>       |                   | Reference: <u>Co-60</u>                 |  | Max. Capacity: <u>330 Ci</u> |                   |                   |                   |
| Shield P/N: <u>26001-100</u>  |            | Shield S/N: <u>C613-A06</u> |                   | Lot: <u>02A0501008</u>                  |  |                              |                   |                   |                   |
| Profile Process Data  |            |                             |                   |   |  |                              |                   |                   |                   |
| Source Model: <u>924-13</u>   |            | Source S/N: <u>8277478</u>  |                   | Reference: <u>Co-60</u>                 |  | Activity: <u>175.6 Ci</u>    |                   |                   |                   |
| Survey Inst: <u>E600</u>  |            | Serial: <u>1963</u>         |                   | Date Cal: <u>3/24/09</u>                |  | Date Due: <u>3/24/10</u>     |                   |                   |                   |
| Inst. Probe: <u>HPA270</u>  |            | Serial: <u>00543</u>        |                   | Capacity Correction Factor: <u>1.06</u> |  |                              |                   |                   |                   |
| Measured Data Data Matrix   |            |                             |                   |   |  |                              |                   |                   |                   |
| Location  | At Surface | Surface Corr. Factor        | At 30 Cm (Note 2) | At 30 Cm (Note 2)                       | At 30 Cm (Note 2)  | At 30 Cm (Note 2)            | At 30 Cm (Note 2) | At 30 Cm (Note 2) | At 30 Cm (Note 2) |
| Top   | 14         | 1.07                        | NA                | .38                                     | 26   | NA                           | .54               |                   |                   |
| Right   | 18         | 1.06                        |                   | .50                                     | 32   |                              | .85               |                   |                   |
| Front   | 24         | 1.06                        |                   | .48                                     | 61   |                              | 1.1               |                   |                   |
| Left  | 33         | 1.06                        |                   | .63                                     | 59   |                              | 1.1               |                   |                   |
| Back  | 13         | 1.06                        |                   | .51                                     | 23   |                              | .98               |                   |                   |
| Bottom  | 19         | 1.07                        |                   | .50                                     | 35   |                              | .94               |                   |                   |
| Acceptance Criteria   |            |                             |                   |   |  |                              |                   |                   |                   |
| Results (Check one): <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject <input type="checkbox"/> NA <input type="checkbox"/> $\leq 5.0$   |            |                             |                   |   |  |                              |                   |                   |                   |
| Inspector: <u>[Signature]</u> Date: <u>3/6/10</u> NCR: <u>9</u>   |            |                             |                   |   |  |                              |                   |                   |                   |
| Comments: <u>All but bottom 1 inch readings are less than 1.06 - 0.6</u><br><u>Bottom 1 inch reading is less than 1.06 - 0.5</u>  |            |                             |                   |   |  |                              |                   |                   |                   |
| <p><b>Notes:</b></p> <ol style="list-style-type: none"> <li>Refer to FQ-180B-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or FQ-180B-3, Shield Profile Worksheet for new meter acceptance tests.</li> <li>The 30 cm readings are only required when specifically requested.</li> <li>Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.</li> <li>Attach auto profiler print out to this sheet if used.</li> </ol> |            |                             |                   |   |  |                              |                   |                   |                   |
| FQ-180B-2, rev. 4      Page 1 of 1      29 January 2010   |            |                             |                   |   |  |                              |                   |                   |                   |



| TP180C Radiation Profile Inspection   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
|---|--------------------------|----------------------|-------------------|-------------------------------------|--|--------------------------|--|--|--|----------|--------------------------|--|--|--------------------------|--|--|------------|----------------------|-------------------|--------------|------------|-------------------|-----|----|------|----|-----|----|----|-------|----|------|--|-----|----|------|-------|----|------|--|------|----|------|------|----|------|--|------|----|------|------|----|------|--|------|----|------|--------|----|------|--|-----|----|-----|---------------------------|--|--|----|-------|--|--|----------------------|--|--|--------|-------------------------------------|--------|--------------------------|
| Initial Build Profile Results   |                          |                      |                   |                                     | Post Test Profile Results  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between; align-items: center;"> <div>QSA GLOBAL</div> <div>SHIELDING PROFILE AND INSPECTION FORM<br/>(SPI)<br/>E-Q-1806-3</div> </div>  |                          |                      |                   |                                     | <div style="display: flex; justify-content: space-between; align-items: center;"> <div>QSA GLOBAL</div> <div>SHIELDING PROFILE AND INSPECTION FORM<br/>(SPI)<br/>E-Q-1806-3</div> </div> |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <span>Equipment Test Set 6</span> <span>Sheet 1 of 1</span> </div>   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <div>Model: <u>Scalpy 330</u> Serial: <u>TP180C</u> Roll-over: <u>C-60</u> Max. Capacity: <u>330 Ci</u></div> <div>Shield P/N: <u>86001-330</u> Shield Part: <u>C601-A06</u> Lot: <u>09/6301210</u></div> </div>   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <div>Source Model: <u>424-1</u> Source Ser.: <u>477470</u> Roll-over: <u>C-60</u> Activity: <u>312.8 Ci</u></div> <div>Survey Int.: <u>E600</u> Serial: <u>1863</u> Date Cal.: <u>2/24/09</u> Date Due: <u>2/24/10</u></div> </div>  |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <div>Unit: <u>HP-270</u> Serial: <u>00542</u> Capacity Correction Factor: <u>1.06</u></div> </div>   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| <table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <thead> <tr> <th rowspan="2">Location</th> <th colspan="3">Measured Data Rate mR/hr</th> <th colspan="3">Adjusted Data Rate mR/hr</th> </tr> <tr> <th>At Surface</th> <th>Surface Corr. Factor</th> <th>At 30 Cm [Note 2]</th> <th>At One Meter</th> <th>At Surface</th> <th>At 30 Cm [Note 2]</th> </tr> </thead> <tbody> <tr> <td>Top</td> <td>17</td> <td>1.09</td> <td>NA</td> <td>.56</td> <td>20</td> <td>NA</td> </tr> <tr> <td>Right</td> <td>55</td> <td>1.06</td> <td></td> <td>.96</td> <td>62</td> <td>1.62</td> </tr> <tr> <td>Front</td> <td>27</td> <td>1.06</td> <td></td> <td>1.30</td> <td>30</td> <td>1.38</td> </tr> <tr> <td>Left</td> <td>55</td> <td>1.06</td> <td></td> <td>1.43</td> <td>62</td> <td>1.53</td> </tr> <tr> <td>Rear</td> <td>30</td> <td>1.06</td> <td></td> <td>1.45</td> <td>34</td> <td>1.54</td> </tr> <tr> <td>Bottom</td> <td>32</td> <td>1.05</td> <td></td> <td>.74</td> <td>37</td> <td>.78</td> </tr> <tr> <td colspan="3" style="text-align: right;">Acceptance Criteria: &lt;200</td> <td>NA</td> <td colspan="3" style="text-align: right;">&lt;1050</td> </tr> <tr> <td colspan="3" style="text-align: right;">Results (Check one):</td> <td>Accept</td> <td><input checked="" type="checkbox"/></td> <td>Reject</td> <td><input type="checkbox"/></td> </tr> </tbody></table> |                          |                      |                   |                                     |  |                          |  |  |  | Location | Measured Data Rate mR/hr |  |  | Adjusted Data Rate mR/hr |  |  | At Surface | Surface Corr. Factor | At 30 Cm [Note 2] | At One Meter | At Surface | At 30 Cm [Note 2] | Top | 17 | 1.09 | NA | .56 | 20 | NA | Right | 55 | 1.06 |  | .96 | 62 | 1.62 | Front | 27 | 1.06 |  | 1.30 | 30 | 1.38 | Left | 55 | 1.06 |  | 1.43 | 62 | 1.53 | Rear | 30 | 1.06 |  | 1.45 | 34 | 1.54 | Bottom | 32 | 1.05 |  | .74 | 37 | .78 | Acceptance Criteria: <200 |  |  | NA | <1050 |  |  | Results (Check one): |  |  | Accept | <input checked="" type="checkbox"/> | Reject | <input type="checkbox"/> |
| Location  | Measured Data Rate mR/hr |                      |                   | Adjusted Data Rate mR/hr            |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
|   | At Surface               | Surface Corr. Factor | At 30 Cm [Note 2] | At One Meter                        | At Surface   | At 30 Cm [Note 2]        |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| Top   | 17                       | 1.09                 | NA                | .56                                 | 20   | NA                       |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| Right   | 55                       | 1.06                 |                   | .96                                 | 62   | 1.62                     |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| Front   | 27                       | 1.06                 |                   | 1.30                                | 30   | 1.38                     |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| Left  | 55                       | 1.06                 |                   | 1.43                                | 62   | 1.53                     |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| Rear  | 30                       | 1.06                 |                   | 1.45                                | 34   | 1.54                     |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| Bottom  | 32                       | 1.05                 |                   | .74                                 | 37   | .78                      |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| Acceptance Criteria: <200   |                          |                      | NA                | <1050                               |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| Results (Check one):  |                          |                      | Accept            | <input checked="" type="checkbox"/> | Reject   | <input type="checkbox"/> |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <div>Inspector: <u>[Signature]</u> Date: <u>2/5/09</u> NCR # _____</div> </div>  |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| <p>Comments:</p> <p>All readings are less than background of .04 mR/h</p> <p>1 mR/hr readings taken with E600, SN 2759, cal 2/24/09, in 200410 do to its 30 sec scale approx. 7.2.</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>1. Refer to E-Q-1806-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or E-Q-1806-3, Shield Profile Worksheet for One meter acceptance limit.</li> <li>2. The 30cm readings are only required when specifically requested.</li> <li>3. Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.</li> <li>4. Correct instrument calibration records for instrument uncertainty.</li> </ol>   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between; font-size: 0.7em;"> <span>E-Q-1806-3, rev. 3</span> <span>Page 1 of 1</span> <span>8 March 2009</span> </div>  |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |      |       |    |      |  |      |    |      |      |    |      |  |      |    |      |      |    |      |  |      |    |      |        |    |      |  |     |    |     |                           |  |  |    |       |  |  |                      |  |  |        |                                     |        |                          |

  

| TP180C Radiation Profile Inspection   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
|---|--------------------------|----------------------|-------------------|-------------------------------------|--|--------------------------|--|--|--|----------|--------------------------|--|--|--------------------------|--|--|------------|----------------------|-------------------|--------------|------------|-------------------|-----|----|------|----|-----|----|----|-------|----|------|--|-----|----|-----|-------|----|------|--|-----|----|-----|------|----|------|--|-----|----|------|------|----|------|--|-----|----|-----|--------|----|------|--|-----|----|-----|---------------------------|--|--|----|-----|--|--|----------------------|--|--|--------|-------------------------------------|--------|--------------------------|
| Initial Build Profile Results   |                          |                      |                   |                                     | Post Test Profile Results  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between; align-items: center;"> <div>QSA GLOBAL</div> <div>SHIELDING PROFILE AND INSPECTION FORM<br/>(SPI)<br/>E-Q-1806-3</div> </div>  |                          |                      |                   |                                     | <div style="display: flex; justify-content: space-between; align-items: center;"> <div>QSA GLOBAL</div> <div>SHIELDING PROFILE AND INSPECTION FORM<br/>(SPI)<br/>E-Q-1806-3</div> </div> |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <span>Equipment Test Set 6</span> <span>Sheet 1 of 1</span> </div>   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <div>Model: <u>Scalpy 330</u> Serial: <u>TP180C</u> Roll-over: <u>C-60</u> Max. Capacity: <u>330 Ci</u></div> <div>Shield P/N: <u>86001-330</u> Shield Part: <u>C601-A06</u> Lot: <u>09/6301210</u></div> </div>   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <div>Source Model: <u>424-1</u> Source Ser.: <u>477470</u> Roll-over: <u>C-60</u> Activity: <u>312.8 Ci</u></div> <div>Survey Int.: <u>E600</u> Serial: <u>1863</u> Date Cal.: <u>2/24/09</u> Date Due: <u>2/24/10</u></div> </div>  |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <div>Unit: <u>HP-270</u> Serial: <u>00542</u> Capacity Correction Factor: <u>1.06</u></div> </div>   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| <table border="1" style="width: 100%; border-collapse: collapse; font-size: 0.8em;"> <thead> <tr> <th rowspan="2">Location</th> <th colspan="3">Measured Data Rate mR/hr</th> <th colspan="3">Adjusted Data Rate mR/hr</th> </tr> <tr> <th>At Surface</th> <th>Surface Corr. Factor</th> <th>At 30 Cm [Note 2]</th> <th>At One Meter</th> <th>At Surface</th> <th>At 30 Cm [Note 2]</th> </tr> </thead> <tbody> <tr> <td>Top</td> <td>14</td> <td>1.09</td> <td>NA</td> <td>.28</td> <td>26</td> <td>NA</td> </tr> <tr> <td>Right</td> <td>23</td> <td>1.06</td> <td></td> <td>.44</td> <td>41</td> <td>.74</td> </tr> <tr> <td>Front</td> <td>30</td> <td>1.06</td> <td></td> <td>.44</td> <td>53</td> <td>.74</td> </tr> <tr> <td>Left</td> <td>40</td> <td>1.06</td> <td></td> <td>.76</td> <td>71</td> <td>1.22</td> </tr> <tr> <td>Rear</td> <td>17</td> <td>1.06</td> <td></td> <td>.56</td> <td>30</td> <td>.95</td> </tr> <tr> <td>Bottom</td> <td>21</td> <td>1.07</td> <td></td> <td>.46</td> <td>29</td> <td>.78</td> </tr> <tr> <td colspan="3" style="text-align: right;">Acceptance Criteria: &lt;200</td> <td>NA</td> <td colspan="3" style="text-align: right;">&lt;50</td> </tr> <tr> <td colspan="3" style="text-align: right;">Results (Check one):</td> <td>Accept</td> <td><input checked="" type="checkbox"/></td> <td>Reject</td> <td><input type="checkbox"/></td> </tr> </tbody></table> |                          |                      |                   |                                     |  |                          |  |  |  | Location | Measured Data Rate mR/hr |  |  | Adjusted Data Rate mR/hr |  |  | At Surface | Surface Corr. Factor | At 30 Cm [Note 2] | At One Meter | At Surface | At 30 Cm [Note 2] | Top | 14 | 1.09 | NA | .28 | 26 | NA | Right | 23 | 1.06 |  | .44 | 41 | .74 | Front | 30 | 1.06 |  | .44 | 53 | .74 | Left | 40 | 1.06 |  | .76 | 71 | 1.22 | Rear | 17 | 1.06 |  | .56 | 30 | .95 | Bottom | 21 | 1.07 |  | .46 | 29 | .78 | Acceptance Criteria: <200 |  |  | NA | <50 |  |  | Results (Check one): |  |  | Accept | <input checked="" type="checkbox"/> | Reject | <input type="checkbox"/> |
| Location  | Measured Data Rate mR/hr |                      |                   | Adjusted Data Rate mR/hr            |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
|   | At Surface               | Surface Corr. Factor | At 30 Cm [Note 2] | At One Meter                        | At Surface   | At 30 Cm [Note 2]        |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| Top   | 14                       | 1.09                 | NA                | .28                                 | 26   | NA                       |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| Right   | 23                       | 1.06                 |                   | .44                                 | 41   | .74                      |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| Front   | 30                       | 1.06                 |                   | .44                                 | 53   | .74                      |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| Left  | 40                       | 1.06                 |                   | .76                                 | 71   | 1.22                     |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| Rear  | 17                       | 1.06                 |                   | .56                                 | 30   | .95                      |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| Bottom  | 21                       | 1.07                 |                   | .46                                 | 29   | .78                      |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| Acceptance Criteria: <200   |                          |                      | NA                | <50                                 |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| Results (Check one):  |                          |                      | Accept            | <input checked="" type="checkbox"/> | Reject   | <input type="checkbox"/> |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between;"> <div>Inspector: <u>[Signature]</u> Date: <u>2/5/09</u> NCR # _____</div> </div>  |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| <p>Comments:</p> <p>All but bottom 1 mR/hr readings are less than background of .06 mR/h</p> <p>Bottom 1 mR/hr readings are less than background of .32 mR/h</p> <p>1 mR/hr readings on 2/23/09, which is 192.9, CCF=1.67</p> <p>Notes:</p> <ol style="list-style-type: none"> <li>1. Refer to E-Q-1806-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or E-Q-1806-3, Shield Profile Worksheet for One meter acceptance limit.</li> <li>2. The 30cm readings are only required when specifically requested.</li> <li>3. Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.</li> <li>4. Correct instrument calibration records for instrument uncertainty.</li> </ol>  |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |
| <div style="display: flex; justify-content: space-between; font-size: 0.7em;"> <span>E-Q-1806-3, rev. 6</span> <span>Page 1 of 1</span> <span>27 January 2010</span> </div>   |                          |                      |                   |                                     |  |                          |  |  |  |          |                          |  |  |                          |  |  |            |                      |                   |              |            |                   |     |    |      |    |     |    |    |       |    |      |  |     |    |     |       |    |      |  |     |    |     |      |    |      |  |     |    |      |      |    |      |  |     |    |     |        |    |      |  |     |    |     |                           |  |  |    |     |  |  |                      |  |  |        |                                     |        |                          |



| TP180E Radiation Profile Inspection  |            |                       |                   |                                  |  |                       |                   |              |  |
|--|------------|-----------------------|-------------------|----------------------------------|--|-----------------------|-------------------|--------------|--|
| Initial Build Profile Results  |            |                       |                   |                                  | Post Test Profile Results  |                       |                   |              |  |
| <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">QSA GLOBAL</div> <div style="border: 1px solid black; padding: 2px;">SHIELDING PROFILE AND INSPECTION FORM (SPIF)<br/>PQ-1806-2</div> </div>   |            |                       |                   |                                  | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="border: 1px solid black; padding: 2px;">QSA GLOBAL</div> <div style="border: 1px solid black; padding: 2px;">SHIELDING PROFILE AND INSPECTION FORM (SPIF)<br/>PQ-1806-2</div> </div> |                       |                   |              |  |
| Sheet 1 of 1   |            |                       |                   |                                  |  |                       |                   |              |  |
| Shield Data  |            |                       |                   |                                  |  |                       |                   |              |  |
| Model: 38010-330   |            | Serial #: TP180E      |                   | Radionuclide: Co-60              |  | Max. Capacity: 330 Ci |                   |              |  |
| Shield P/N: 86001-330  |            | Shield Mat: C611-A06  |                   | Lot #: 0919700907                |  |                       |                   |              |  |
| Profile Process Data   |            |                       |                   |                                  |  |                       |                   |              |  |
| Source Model: 914-12   |            | Source Ser. #: 277478 |                   | Radionuclide: Co-60              |  | Activity: 310 Ci      |                   |              |  |
| Survey Inst.: E600   |            | Serial #: 1263        |                   | Date Cal.: 2/24/10               |  | Date Rec.: 2/24/10    |                   |              |  |
| Inst. Probe: HP270   |            | Serial #: 00642       |                   | Capacity Correction Factor: 1.06 |  |                       |                   |              |  |
| Measured Data Rate mR/hr   |            |                       |                   |                                  |  |                       |                   |              |  |
| Location   | At Surface | Surface Corr. Factor  | At 30 Cm (Note 2) | At One Meter                     | At Surface   | Surface Corr. Factor  | At 30 Cm (Note 2) | At One Meter |  |
| Top  | 20         | 1.09                  | NA                | .40                              | 23   | NA                    | .42               |              |  |
| Right  | 45         | 1.06                  |                   | .81                              | 51   |                       | .86               |              |  |
| Front  | 31         | 1.06                  |                   | .36                              | 35   |                       | .38               |              |  |
| Left   | 35         | 1.06                  |                   | .87                              | 39   |                       | .93               |              |  |
| Rear   | 34         | 1.06                  |                   | 1.65                             | 38   |                       | 1.7               |              |  |
| Bottom   | 25         | 1.09                  |                   | .50                              | 29   |                       | .53               |              |  |
| Acceptance Criteria:   |            | ≤ 200                 |                   | NA                               |  | ≤ 400                 |                   | 50           |  |
| Result: (Check one)  |            | Accept                |                   | ✓                                |  | Reject                |                   |              |  |
| Inspector: <u>[Signature]</u> Date: <u>2/28/10</u> NCR # _____   |            |                       |                   |                                  |  |                       |                   |              |  |
| Comments:<br>At all locations, readings are less than or equal to .05  |            |                       |                   |                                  |  |                       |                   |              |  |
| Notes:<br>1. Refer to PQ-1806-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or PQ-1806-3, Shield Profile Worksheet for One meter acceptance limit.<br>2. The 30cm readings are only required when specifically requested.<br>3. Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.<br>4. Attach into profile prior to use for instrument stability. |            |                       |                   |                                  |  |                       |                   |              |  |
| PQ-1806-2, rev. 1      Page 1 of 1      9 March 2009   |            |                       |                   |                                  |  |                       |                   |              |  |
| Shield Data  |            |                       |                   |                                  |  |                       |                   |              |  |
| Model: Source PHS  |            | Serial #: TP180E      |                   | Radionuclide: Co-60              |  | Max. Capacity: 330 Ci |                   |              |  |
| Shield P/N: 86001-330  |            | Shield Mat: C611-A06  |                   | Lot #: 0919700907                |  |                       |                   |              |  |
| Profile Process Data   |            |                       |                   |                                  |  |                       |                   |              |  |
| Source Model: 914-12   |            | Source Ser. #: 277478 |                   | Radionuclide: Co-60              |  | Activity: 310 Ci      |                   |              |  |
| Survey Inst.: E600   |            | Serial #: 1263        |                   | Date Cal.: 2/24/10               |  | Date Rec.: 2/24/10    |                   |              |  |
| Survey Inst.: NA   |            | Serial #: NA          |                   | Date Cal.: NA                    |  | Date Rec.: NA         |                   |              |  |
| Inst. Probe: HP270   |            | Serial #: 00542       |                   | Inst. Probe: NA                  |  | Serial #: NA          |                   |              |  |
| Capacity Correction Factor: 1.67   |            |                       |                   |                                  |  |                       |                   |              |  |
| Measured Data Rate mR/hr   |            |                       |                   |                                  |  |                       |                   |              |  |
| Location   | At Surface | Surface Corr. Factor  | At 30 Cm (Note 2) | At One Meter                     | At Surface   | Surface Corr. Factor  | At 30 Cm (Note 2) | At One Meter |  |
| Top  | 13         | 1.07                  | NA                | .3                               | 24   | NA                    | .5                |              |  |
| Right  | 16         | 1.06                  |                   | .6                               | 29   |                       | 1.0               |              |  |
| Front  | 19         | 1.06                  |                   | .7                               | 34   |                       | 1.2               |              |  |
| Left   | 22         | 1.06                  |                   | .6                               | 39   |                       | 1.0               |              |  |
| Rear   | 13         | 1.06                  |                   | .5                               | 23   |                       | .9                |              |  |
| Bottom   | 14         | 1.07                  |                   | .9                               | 26   |                       | .5                |              |  |
| Acceptance Criteria:   |            | ≤ 200                 |                   | NA                               |  | ≤ 400                 |                   | 55.0         |  |
| Result: (Check one)  |            | Accept                |                   | ✓                                |  | Reject                |                   |              |  |
| Inspector: <u>[Signature]</u> Date: <u>3/16/10</u> NCR # _____   |            |                       |                   |                                  |  |                       |                   |              |  |
| Comments:<br>At all locations, 1 meter readings are less than or equal to 0.03 mR/hr.<br>Bottom 1 meter reading is less than 0.05 mR/hr.   |            |                       |                   |                                  |  |                       |                   |              |  |
| Notes:<br>1. Refer to PQ-1806-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or PQ-1806-3, Shield Profile Worksheet for One meter acceptance limit.<br>2. The 30cm readings are only required when specifically requested.<br>3. Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.<br>4. Attach into profile prior to use for instrument stability. |            |                       |                   |                                  |  |                       |                   |              |  |
| PQ-1806-2, rev. 4      Page 1 of 1      27 January 2010  |            |                       |                   |                                  |  |                       |                   |              |  |



| TP180G Radiation Profile Inspection  |                              |   |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
|--|------------------------------|---|------------------------------|--------------|--|-------------------|-----------------------|--|--|-------------|--|--|--|--|--|--|--|--|--|------------------------|-----------------------|-------------------------|------------------------------|--|--|--|--|--|--|-----------------------------|------------------------------|------------------------|--|--|--|--|--|--|--|
| Initial Build Profile Results  |                              |   |                              |              | Post Test Profile Results  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: left;"> </div> <div style="text-align: right;"> <b>SHIELDING PROFILE AND INSPECTION FORM (SPI)</b><br/> <b>FQ-180G-2</b> </div> </div>   |                              |   |                              |              | <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: left;"> </div> <div style="text-align: right;"> <b>SHIELDING PROFILE AND INSPECTION FORM (SPI)</b><br/> <b>FQ-180G-3</b> </div> </div> |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Sheet 2 of 1   |                              |   |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="10" style="text-align: center;">Shield Data</td> </tr> <tr> <td>Model: <b>8610-330</b></td> <td>Serial: <b>TP180G</b></td> <td>Radiation: <b>Co-60</b></td> <td>Max. Capacity: <b>330 Ci</b></td> <td colspan="6"></td> </tr> <tr> <td>Shield P/N: <b>8601-330</b></td> <td>Shield Size: <b>C615-A05</b></td> <td>Lot: <b>0922200819</b></td> <td colspan="7"></td> </tr> </table>  |                              |   |                              |              |  |                   |                       |  |  | Shield Data |  |  |  |  |  |  |  |  |  | Model: <b>8610-330</b> | Serial: <b>TP180G</b> | Radiation: <b>Co-60</b> | Max. Capacity: <b>330 Ci</b> |  |  |  |  |  |  | Shield P/N: <b>8601-330</b> | Shield Size: <b>C615-A05</b> | Lot: <b>0922200819</b> |  |  |  |  |  |  |  |
| Shield Data  |                              |   |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Model: <b>8610-330</b>   | Serial: <b>TP180G</b>        | Radiation: <b>Co-60</b>                 | Max. Capacity: <b>330 Ci</b> |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Shield P/N: <b>8601-330</b>  | Shield Size: <b>C615-A05</b> | Lot: <b>0922200819</b>                  |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Profile Process Data   |                              |   |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Source Model: <b>424-13</b>  | Source Ser.: <b>277478</b>   | Radiation: <b>Co-60</b>                 | Activity: <b>307.9 Ci</b>    |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Source Inst.: <b>6600</b>  | Serial: <b>1263</b>          | Date Cal.: <b>2/27/07</b>               | Date Rec.: <b>2/29/10</b>    |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Inst. P/N: <b>M9270</b>  | Serial: <b>00542</b>         | Capacity Correction Factor: <b>1.07</b> |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Measured Data Rate mR/hr   |                              |   |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Location   | As Surface                   | Surface Corr. Factor                    | At 30 Cm (Note 2)            | At One Meter | At Surface   | At 30 Cm (Note 2) | At One Meter (Note 1) |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Top  | 20                           | 1.09                                    | NA                           | 4            | 23   | NA                | 4                     |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Right  | 45                           | 1.06                                    |                              | 9            | 51   |                   | 1.0                   |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Front  | 41                           | 1.06                                    | 10.9                         | 47           |  |                   | 1.0                   |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Left   | 42                           | 1.06                                    |                              | 1.0          | 48   |                   | 1.1                   |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Rear   | 47                           | 1.06                                    |                              | 1.6          | 53   |                   | 1.7                   |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Bottom   | 25                           | 1.07                                    |                              | .5           | 29   |                   | .3                    |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Acceptance Criteria: <b>&lt;200 NA ≤ 5.0</b>   |                              |   |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Result: (Check one) <input checked="" type="checkbox"/> Accept <input type="checkbox"/> Reject   |                              |   |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Inspector: <u>[Signature]</u> Date: <u>2/5/10</u> NCR # _____<br>Comments: <u>All 1 mR/hr readings are less than record of 0.1</u><br>Notes:<br>1. Refer to FQ-180G-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or FQ-180G-2, Shield Profile Worksheet for new master acceptance limit.<br>2. The 30cm readings are only required when specifically requested.<br>3. Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.<br>4. Complete instrument calibration/records for instrument uncertainty. |                              |   |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |
| Page 1 of 1  |                              |   |                              |              |  |                   |                       |  |  |             |  |  |  |  |  |  |  |  |  |                        |                       |                         |                              |  |  |  |  |  |  |                             |                              |                        |  |  |  |  |  |  |  |

|  |                              |   |                              |              |            |                   |                       |  |  |
|--|------------------------------|---|------------------------------|--------------|------------|-------------------|-----------------------|--|--|
| Shield Data  |                              |   |                              |              |            |                   |                       |  |  |
| Model: <b>8610-330</b>   | Serial: <b>TP180G</b>        | Radiation: <b>Co-60</b>                 | Max. Capacity: <b>330 Ci</b> |              |            |                   |                       |  |  |
| Shield P/N: <b>8601-330</b>  | Shield Size: <b>C615-A05</b> | Lot: <b>0922200819</b>                  |                              |              |            |                   |                       |  |  |
| Profile Process Data   |                              |   |                              |              |            |                   |                       |  |  |
| Source Model: <b>424-13</b>  | Source Ser.: <b>277478</b>   | Radiation: <b>Co-60</b>                 | Activity: <b>307.9 Ci</b>    |              |            |                   |                       |  |  |
| Source Inst.: <b>6600</b>  | Serial: <b>1263</b>          | Date Cal.: <b>2/27/07</b>               | Date Rec.: <b>2/29/10</b>    |              |            |                   |                       |  |  |
| Inst. P/N: <b>M9270</b>  | Serial: <b>00542</b>         | Capacity Correction Factor: <b>1.07</b> |                              |              |            |                   |                       |  |  |
| Measured Data Rate mR/hr   |                              |   |                              |              |            |                   |                       |  |  |
| Location   | As Surface                   | Surface Corr. Factor                    | At 30 Cm (Note 2)            | At One Meter | At Surface | At 30 Cm (Note 2) | At One Meter (Note 1) |  |  |
| Top  | 15                           | 1.07                                    | NA                           | .32          | 28         | NA                | .54                   |  |  |
| Right  | 23                           | 1.06                                    |                              | .42          | 21         |                   | .71                   |  |  |
| Front  | 300                          | 1.05                                    |                              | 1.3          | 532        |                   | 2.20                  |  |  |
| Left   | 28                           | 1.06                                    |                              | .63          | 50         |                   | 1.7                   |  |  |
| Rear   | 14                           | 1.06                                    |                              | .48          | 25         |                   | .81                   |  |  |
| Bottom   | 13                           | 1.07                                    |                              | .57          | 42         |                   | .66                   |  |  |
| Acceptance Criteria: <b>&lt;200 NA ≤ 5.0</b>   |                              |   |                              |              |            |                   |                       |  |  |
| Result: (Check one) <input type="checkbox"/> Accept <input checked="" type="checkbox"/> Reject   |                              |   |                              |              |            |                   |                       |  |  |
| Inspector: <u>[Signature]</u> Date: <u>2/5/10</u> NCR # _____<br>Comments: <u>All 1 mR/hr readings are less than record of 0.1</u><br>Notes:<br>1. Refer to FQ-180G-1, Shield Efficiency Testing Surface Correction Factors for an existing device model, or FQ-180G-2, Shield Profile Worksheet for new master acceptance limit.<br>2. The 30cm readings are only required when specifically requested.<br>3. Additional sheets may be used to describe results or indicate reading locations using sketches. Number all sheets and indicate total number of sheets. Make sure shield identification is included on each sheet.<br>4. Complete instrument calibration/records for instrument uncertainty. |                              |   |                              |              |            |                   |                       |  |  |
| Page 1 of 1  |                              |   |                              |              |            |                   |                       |  |  |



## Appendix B: Adjusted Drop Height Worksheet

| SENTRY Test Plan 180 Adjusted Drop Height Worksheet |          |                                   |                            |        |                          |        |                              |        |
|---|----------|-----------------------------------|----------------------------|--------|--------------------------|--------|------------------------------|--------|
| Test Specimen                                       | Config.  | Actual Test Specimen Weight (Lbs) | Adjusted Drop Heights (*1) |        |                          |        |                              |        |
|   |          |                                   | 4-Foot Free Drop Height    |        | 30-Foot Free Drop Height |        | 40-Inch Puncture Drop Height |        |
|   |          |                                   | Feet                       | Inches | Feet                     | Inches | Feet                         | Inches |
| TP180A  | Basic    | 655                               | 4.3                        | 51.3   | 32.1                     | 384.7  | 3.6                          | 42.7   |
| TP180B  | Basic    | 656                               | 4.3                        | 51.2   | 32.0                     | 384.1  | 3.6                          | 42.7   |
| TP180C  | Basic    | 652                               | 4.3                        | 51.5   | 32.2                     | 386.5  | 3.6                          | 42.9   |
| TP180D  | Basic    | 657                               | 4.3                        | 51.1   | 32.0                     | 383.6  | 3.6                          | 42.6   |
| TP180E  | Basic    | 659                               | 4.2                        | 51.0   | 31.9                     | 382.4  | 3.5                          | 42.5   |
| TP180F  | Standard | 743                               | 4.2                        | 45.2   | 31.5                     | 377.9  | 3.5                          | 42.0   |
| TP180G  | Standard | 728                               | 4.3                        | 46.2   | 32.1                     | 385.7  | 3.6                          | 42.9   |
| TP180H  | Basic    | 664                               | 4.2                        | 50.6   | 31.6                     | 379.5  | 3.5                          | 42.2   |
| TP180J  | Changer  | TBD                               |                            |        |                          |        |                              |        |

| SENTRY Transport Package Maximum Energy Determination |          |                           |                        |                  |                    |
|---|----------|---------------------------|------------------------|------------------|--------------------|
| Assembly Number                                       | Config.  | Maximum Weight (*2) (Lbs) | Maximum Energy (*3) at |                  |                    |
|   |          |                           | 4 Feet (Lbs-Ft)        | 30 Feet (Lbs-Ft) | 40 inches (Lbs-Ft) |
| 86015-330   | Basic    | 700                       | 2800                   | 21000            | 2333               |
| 86000-330   | Standard | 780                       | 3120                   | 23400            | 2600               |
| 86015-110   | Basic    | 500                       | 2000                   | 15000            | 1667               |
| 86000-110   | Standard | 580                       | 2320                   | 17400            | 1933               |

- (\*1) Adjusted drop heights (Feet) = Maximum Energy (Lbs-Ft) / Actual Test Specimen Weight (Lbs)  
 (\*2) Maximum weight for the Basic configurations is without the 80 pound rib structure.  
 (\*3) Maximum Energy = Maximum Weight (Lbs) X Drop Height (Ft)

| APPROVALS          |                                |
|--------------------|--------------------------------|
| Originator:        | <u>S. Gumi</u> 25 Feb 2010     |
| Engineering:       | <u>D. Hill</u> 25 Feb 10       |
| Regulatory:        | <u>R. P. Hill</u> 25 Feb 10    |
| Quality Assurance: | <u>C. Roughton</u> 25 Feb 2010 |



### **Appendix C: Test Data Worksheets**

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See Attached.

### **Appendix D: Test Specimen Manufacturing Records**

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See Attached.

### **Appendix E: Test Specimen Inspection Records**

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See Attached.

### **Appendix F: Test & Measurement Calibration Records**

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See Attached.



Free Drop & Puncture Test Checklist

|   |   |                           |
|---|---|---------------------------|
| Test:   | 30-Foot Free Drop Test                        |                           |
| Test Location:  | QSA Global Burlington MA                      |                           |
|   | Step  | Data                      |
| 1. Record test specimen serial number:  | TP180A  |                           |
| 2. Record the test specimen weight:   | 655 LBS.                                      |                           |
| 3. Record the ambient temperature:  | 53°F  | Instrument S/N:<br>ENG-20 |
| 4. Identify set-up orientation figure:  | ORIENTATION #1.<br>HIT ON REAR ACCESS PORT    |                           |
| 5. Record drop height.  | 32.2 FEET<br>USED T10761-32.2<br>S/N: TP180-2 |                           |
| 6. Photograph set-up in at least two perpendicular planes. ✓  |   |                           |
| 7. Begin video recording of the test so that impact is recorded. ✓  |   |                           |
| 8. Release the test specimen. ✓   |   |                           |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.   |   |                           |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.   |   |                           |
| <u>• REAR ACCESS PORT BENT IN TOWARDS CENTER OF PART.</u><br><u>• EDGE OF WELDED BODY DENTED NEAR REAR ACCESS PORT.</u><br><br><u>• ATTEMPT TO RE-HIT PORT SQUARELY - DROP SAME TEST SPECIMEN AGAIN.</u>  |   |                           |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach.  |   |                           |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the 30-foot drop test requirements of 10 CFR Part 71.<br><br><input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the 30-foot drop test requirements of 10 CFR Part 71. |   |                           |
| Test witnessed by (Signature)   | Print Name                                    | Date                      |
| Engineering: <i>S. Grenier</i>  | S. GRENIER                                    | 2 MAR 10                  |
| Regulatory Affairs: <i>L. Pedraza</i>   | L. Pedraza                                    | 1 APR 10                  |
| Quality Assurance: <i>C. Rougier</i>  | C. Rougier                                    | 7 Apr 10                  |



Free Drop & Puncture Test Data Sheet

|   |                         |
|---|-------------------------|
| Test Unit Model/Serial No.: TPI20A  | Test: 30-FOOT FREE DROP |
| Test Date: 2 MAR 10   | Test Time: 10:42 AM     |
| Describe drop orientation and drop height:<br>ORIENTATION #1. HIT ON REAR ACCESS PORT.<br>DROP HEIGHT IS 32.2 FEET AS INDICATED USING T10761-32.2   |                         |
| Describe impact (location, rotation, etc.):<br>IMPACT ON REAR ACCESS PORT.<br>SLIGHT ROTATION TOWARDS EDGE OF CYLINDER BODY   |                         |
| Describe on-site inspection (damage, broken parts, etc.):<br>REAR ACCESS PORT BENT IN TOWARDS DUST COVER.<br>EDGE OF WELDED BODY HAS A SMALL 6-INCH LONG DENT.  |                         |
| On-site test assessment:  |                         |
| <ul style="list-style-type: none"><li>• Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan? <u>Yes</u> or No. Although DROP SPECIMEN AGAIN TO HIT PORT SQUARELY.</li><li>• Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test? <u>Yes</u> or No.</li><li>• Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations. Yes or <u>No</u>. If yes, then identify and justify.</li><li>• Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <u>No</u>.</li><li>• Should testing continue with this test specimen? <u>Yes</u> or No. If yes, next test: 30-FOOT AGAIN.</li><li>• Will the test specimen pass the thermal test based on the accumulated damage assessment? <u>Yes</u> or No</li></ul> |                         |
| Engineering: <u>2MM10</u> Regulatory: <u>AP 1 Apr 10</u> QA: <u>C. RAY</u> <u>7 APR 10</u>  |                         |
| Describe any post-test disassembly and inspection:<br>SEE PUNCTURE TEST DATA SHEET  |                         |
| Describe any change in source position (if possible):<br>NO CHANGE IN SOURCE LOCATION   |                         |
| Describe results of radiography (if performed):<br>NOT PERFORMED.   |                         |
| Completed by: S. GIANI  | Date: 3 MAR 10          |



Free Drop & Puncture Test Checklist

|  |   |                           |
|--|---|---------------------------|
| Test:  | 30-Foot Free Drop Test  |                           |
| Test Location:   | QSA Global Burlington MA  |                           |
|  | Step  | Data                      |
| 1. Record test specimen serial number:   | TP180A (2ND DROP)   |                           |
| 2. Record the test specimen weight:  | 655 LBS.  |                           |
| 3. Record the ambient temperature:   | 54 °F   | Instrument S/N:<br>ENG-20 |
| 4. Identify set-up orientation figure:   | ORIENTATION #1<br>HIT ON REAR ACCESS PORT   |                           |
| 5. Record drop height.   | 32.2 FEET<br>USED T10761-32.2<br>S/N: TP180-3   |                           |
| 6. Photograph set-up in at least two perpendicular planes. ✓   |   |                           |
| 7. Begin video recording of the test so that impact is recorded. ✓   |   |                           |
| 8. Release the test specimen. ✓  |   |                           |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.  |   |                           |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.  | <ul style="list-style-type: none"> <li>• REAR ACCESS PORT CRUSHED INTO ACCESS PORT AREA.</li> <li>• DUST COVER FRACTURED</li> <li>• EDGE OF WELDED BODY DENT SLIGHTLY LARGER (8-INCHES LONG)</li> </ul> |                           |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach. |   |                           |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the 30-foot drop test requirements of 10 CFR Part 71.                                   |   |                           |
| <input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the 30-foot drop test requirements of 10 CFR Part 71.                                      |   |                           |
| Test witnessed by (Signature)  | Print Name  | Date                      |
| Engineering: S. Grenier  | S. GRENIER  | 2 MAR 10                  |
| Regulatory Affairs: L. P. Lohr   | L. P. LOHR  | 1 Apr 10                  |
| Quality Assurance: C. Rougman  | C. ROUGHMAN   | 7 Apr 10                  |



Free Drop & Puncture Test Data Sheet

|   |                               |
|---|-------------------------------|
| Test Unit Model/Serial No.: TP180A  | Test: 30-FOOT FREE DROP (END) |
| Test Date: 2 MAR 10   | Test Time: 11:16 AM           |
| Describe drop orientation and drop height:<br>ORIENTATION #1. HIT ON REAR ACCESS PORT<br>DROP HEIGHT IS 32.2 FEET INDICATED BY T10761-32.2  |                               |
| Describe impact (location, rotation, etc.):<br>IMPACT ON REAR ACCESS PORT<br>VERY MINOR ROTATION TOWARDS CYLINDER BODY EDGE. (HIT MORE SQUARELY ON GENT)  |                               |
| Describe on-site inspection (damage, broken parts, etc.):<br>REAR ACCESS PORT PUCKERED AND PLASTIC DUST COVER FRACTURED.<br>EDGE OF WELDED BODY DENT IS NOW 2-INCHES LONG.  |                               |
| On-site test assessment:  |                               |
| <ul style="list-style-type: none"> <li>Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan? <u>Yes</u> or No.</li> <li>Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test? <u>Yes</u> or No.</li> <li>Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations. Yes or <u>No</u>. If yes, then identify and justify.</li> <li>Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector – Basic configuration because of its thinner rear-plate? Yes or <u>No</u>.</li> <li>Should testing continue with this test specimen? <u>Yes</u> or No. If yes, next test: <u>PUNCTURE DROP</u></li> <li>Will the test specimen pass the thermal test based on the accumulated damage assessment? <u>Yes</u> or No</li> </ul> |                               |
| Engineering: <u>DEM10</u> Regulatory: <u>AP 1 Apr 10</u> QA: <u>Jim A 7 Apr 10</u>  |                               |
| Describe any post-test disassembly and inspection:<br><u>SEE PUNCTURE TEST DATA SHEET</u>   |                               |
| Describe any change in source position (if possible):<br><u>SWIRL LOCATION DID NOT MOVE.</u>  |                               |
| Describe results of radiography (if performed):<br><u>NUT PERFORMED.</u>  |                               |
| Completed by: <u>S. Gorman</u>  | Date: <u>3 MAR 10</u>         |



Free Drop & Puncture Test Checklist

|  |  |                           |
|--|--|---------------------------|
| Test:  | Puncture Test                                    |                           |
| Test Location:   | QSA Global Burlington MA                         |                           |
|  | Step   | Data                      |
| 1. Record test specimen serial number:   | TPI80A   |                           |
| 2. Record the test specimen weight:  | 655 LBS.   |                           |
| 3. Record the ambient temperature:   | 42°F   | Instrument S/N:<br>ENG-20 |
| 4. Identify set-up orientation figure:   | ORIENTATION # 2<br>HIT ON DUST COVER AT AN ANGLE |                           |
| 5. Record drop height:   | 3.6 FEET<br>USED T10761-3.6<br>S/N: TPI80-12     |                           |
| 6. Photograph set-up in at least two perpendicular planes.   |  |                           |
| 7. Begin video recording of the test so that impact is recorded.   |  |                           |
| 8. Release the test specimen.  |  |                           |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.  |  |                           |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.  |  |                           |
| <u>V3 OF PLASTIC DUST COVER TORN OFF. ADDITIONAL CRACKING</u><br><u>TO DUST COVER REMAINING ON PACKAGE.</u>  |  |                           |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach. |  |                           |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the puncture test requirements of 10 CFR Part 71.                                       |  |                           |
| <input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the puncture test requirements of 10 CFR Part 71.  |  |                           |
| Test witnessed by (Signature)  | Print Name                                       | Date                      |
| Engineering: <i>S. Green</i>   | S. GREENEN                                       | 2 MAR 10                  |
| Regulatory Affairs: <i>L. P. Loh</i>   | L. P. Loh  | 1 Apr 10                  |
| Quality Assurance: <i>C. Loughan</i>   | C. Loughan                                       | 7 Apr 10                  |



Free Drop & Puncture Test Data Sheet

|  |   |
|--|---|
| Test Unit Model/Serial No.: TP180A   | Test: Puncture Test   |
| Test Date: 2 MAR 10  | Test Time: 2:45 PM  |
| Describe drop orientation and drop height:<br>ORIENTATION # 2 - HIT ON DUST COVER AT AN ANGLE.<br>DROP HEIGHT IS 3.6 FEET INDICATED BY T10761-3.6  |   |
| Describe impact (location, rotation, etc.):<br>IMPACT LOCATION ON DUST COVER AND LOCK COVER.<br>TEST SPECIMEN ROTATED OFF PUNCTURE BAR AFTER IMPACT.   |   |
| Describe on-site inspection (damage, broken parts, etc.):<br>PLASTIC DUST COVER TORN AND CRACKED.  |   |
| On-site test assessment:   |   |
| <ul style="list-style-type: none"> <li>Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan? <input checked="" type="radio"/> Yes or No.</li> <li>Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test? <input checked="" type="radio"/> Yes or No.</li> <li>Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations. Yes or <input checked="" type="radio"/> No. If yes, then identify and justify.</li> <li>Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <input checked="" type="radio"/> No.</li> <li>Should testing continue with this test specimen? Yes or <input checked="" type="radio"/> No. If yes, next test: _____</li> <li>Will the test specimen pass the thermal test based on the accumulated damage assessment? <input checked="" type="radio"/> Yes or No</li> </ul> |   |
| Engineering: <input checked="" type="radio"/> 2 MAR 10   | Regulatory: <input checked="" type="radio"/> 1 APR 10 QA: <input checked="" type="radio"/> 7 APR 10 |
| Describe any post-test disassembly and inspection: ALL REAR PLATE HARDWARE INTACT.<br>CUT AWAY DUST COVER TO REMOVE REAR PLATE. SHIELD SHIFTED TO REAR, STAGE GOOD.  |   |
| Describe any change in source position (if possible): DUMMY SOURCE WIRE UNAFFECTED.<br>SOURCE LOCATION CHANGED 1/8 INCH TOWARDS FRONT PLATE END.   |   |
| Describe results of radiography (if performed):<br>NOT PERFORMED.  |   |
| Completed by: S. GUN   | Date: 2 MAR 10  |



Test Inspection Data Sheet

|   |   |
|---|---|
| Test Specimen Serial No.: <b>TP180A</b>   | Last Test Performed: <b>PUNCTURE TEST</b> |
| Describe and measure (if appropriate) any damage or broken parts, etc.: <ul style="list-style-type: none"><li>- REAR ACCESS PORT TUBE BENT AND BULGED TOWARDS CENTER</li><li>- LOCK COVER INTACT BUT PLUNGER LOCK BROKEN</li><li>- DUST COVER SPLIT AND BROKEN - PARTIALLY INTACT</li></ul>                       |   |
| Describe and measure (if appropriate) any signs of permanent strain or deformation: <ul style="list-style-type: none"><li>- REAR ACCESS PORT DEFORMED (BENT) ABOUT 0.5 INCH INWARDS</li><li>- REAR ACCESS PORT BULGE ABOUT 0.5 INCH</li><li>- IMPACT DENT ABOUT 8 INCHES LONG ON END CORNER OF PACKAGE.</li></ul> |   |
| Describe the condition of the simulated source wire assembly. <p>NO VISIBLE SIGNS OF DAMAGE TO SIMULATED SOURCE ASSEMBLY.</p>   |   |
| Reassemble the package using a representative active source, making sure that the source position and the package configuration is the same as they were immediately after the last test.   |   |
| Measure and record a radiation profile of each test specimen in accordance with QSA Global Work Instruction WI-Q-1806.  |   |
| Compare the pre-test dose levels with post-test dose levels at the surface of the package and at 1 meter from the surface of the package. <p>ONLY A NEGLIGIBLE DIFFERENCE BETWEEN PRE AND POST DOSE LEVELS ON THE SURFACE AND 1 METER FROM SURFACE OF TESTED PACKAGE.</p>   |   |
| Is a radiograph required to inspect for hidden component damage or failure? If radiography is performed, describe any damage or failures found. <p>NOT PERFORMED.</p>   |   |
| Completed by: <b>S. Glenn</b>   | Date: <b>8 MAR 10</b>                     |



### Free Drop & Puncture Test Checklist

|   |  |                           |
|---|--|---------------------------|
| Test:   | 30-Foot Free Drop Test   |                           |
| Test Location:  | QSA Global Burlington MA   |                           |
|   | Step   | Data                      |
| 1. Record test specimen serial number:  | TP180 B  |                           |
| 2. Record the test specimen weight:   | 656 LBS.   |                           |
| 3. Record the ambient temperature:  | 47 °F  | Instrument S/N:<br>ENG-20 |
| 4. Identify set-up orientation figure:  | ORIENTATION #2.<br>HIT EDGE OF REAR ACCESS PORT  |                           |
| 5. Record drop height.  | 32.2 FT USED T10761-32.2<br>S/N: TP180-8   |                           |
| 6. Photograph set-up in at least two perpendicular planes. ✓  |  |                           |
| 7. Begin video recording of the test so that impact is recorded. ✓  |  |                           |
| 8. Release the test specimen. ✓   |  |                           |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved. ✓   |  |                           |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.   | <u>PROTRUDING EDGE OF REAR ACCESS PORT COMPLETELY</u><br><u>CRUSHED INTO ACCESS PORT AREA AND ONTO PLASTIC</u><br><u>DUST COVER.</u> |                           |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach.<br><br><input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the 30-foot drop test requirements of 10 CFR Part 71.<br><br><input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the 30-foot drop test requirements of 10 CFR Part 71. |  |                           |
| Test witnessed by (Signature)   | Print Name   | Date                      |
| Engineering: <i>S. Grew</i>   | S. GREW  | 2 MAR 10                  |
| Regulatory Affairs: <i>L. P. D. P.</i>  | L. P. D. P.  | 1 Apr 10                  |
| Quality Assurance: <i>C. Rouger</i>   | C. Rouger  | 7 Apr 10                  |



### Free Drop & Puncture Test Data Sheet

|   |                         |
|---|-------------------------|
| Test Unit Model/Serial No.: TP180B  | Test: 30-FOOT FREE DROP |
| Test Date: 2 MAR 10   | Test Time: 1:11 PM      |
| Describe drop orientation and drop height:<br>ORIENTATION #2. HIT ONTO EDGE OF REAR ACCESS PORT.<br>DROP HEIGHT IS 32.2 FEET INDICATED BY T10761-32.2   |                         |
| Describe impact (location, rotation, etc.):<br>IMPACT ONTO EDGE OF REAR ACCESS PORT<br>NO ROTATION.   |                         |
| Describe on-site inspection (damage, broken parts, etc.):<br>ABOUT 2/3 OF REAR ACCESS PORT TUBE FLATTENED INTO THE<br>ACCESS PORT AREA AND ONTO THE PLASTIC DUST COVER.   |                         |
| On-site test assessment:  |                         |
| <ul style="list-style-type: none"> <li>Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan?<br/><input checked="" type="radio"/> Yes or No.</li> <li>Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test?<br/><input checked="" type="radio"/> Yes or No.</li> <li>Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations.<br/>Yes or <input checked="" type="radio"/> No. If yes, then identify and justify.</li> <li>Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <input checked="" type="radio"/> No</li> <li>Should testing continue with this test specimen? <input checked="" type="radio"/> Yes or No. If yes, next test: PUNCTURE DROP</li> <li>Will the test specimen pass the thermal test based on the accumulated damage assessment? <input checked="" type="radio"/> Yes or No</li> </ul> |                         |
| Engineering: <input checked="" type="radio"/> ZMA/10 Regulatory: <input checked="" type="radio"/> 1 Apr 10 QA: <input checked="" type="radio"/> CM/L 7 Apr 10   |                         |
| Describe any post-test disassembly and inspection:<br>COULD NOT DISASSEMBLE WITHOUT CUTTING AWAY PORT TUBE SENT DOWN ONTO REAR PLATE.   |                         |
| Describe any change in source position (if possible):<br>MOVED BY 1/16 INCH SEE SOURCE LOCATION DATA SHEET<br>TOWARD FRONT.   |                         |
| Describe results of radiography (if performed):<br>NOT PERFORMED.   |                         |
| Completed by: S-Gunn  | Date: 3 MAR 10          |



Free Drop & Puncture Test Checklist

|  |  |                                  |
|--|--|----------------------------------|
| Test:  | Puncture Test                            |                                  |
| Test Location:   | QSA Global Burlington MA                 |                                  |
|  | Step                                     | Data                             |
| 1. Record test specimen serial number:   | TP180B                                   |                                  |
| 2. Record the test specimen weight:  | 656 LBS.                                 |                                  |
| 3. Record the ambient temperature:   | 44°F                                     | Instrument S/N:<br>ENG-20        |
| 4. Identify set-up orientation figure:   | ORIENTATION #2.<br>HIT PLASTIC DUST GUSE |                                  |
| 5. Record drop height.   | 3.6 FT                                   | USED T10761-3.6<br>S/N: TP180-14 |
| 6. Photograph set-up in at least two perpendicular planes.   |  |                                  |
| 7. Begin video recording of the test so that impact is recorded.   |  |                                  |
| 8. Release the test specimen.  |  |                                  |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.  |  |                                  |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.  |  |                                  |
| NO DAMAGE FOUND  |  |                                  |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach. |  |                                  |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the puncture test requirements of 10 CFR Part 71.                                       |  |                                  |
| <input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the puncture test requirements of 10 CFR Part 71.  |  |                                  |
| Test witnessed by (Signature)  | Print Name                               | Date                             |
| Engineering: S. Greni  | S. GRENI                                 | 2 MAR 10                         |
| Regulatory Affairs: L. Redolub   | L. Redolub                               | 1 Apr 10                         |
| Quality Assurance: C. Loughan  | C Loughan                                | 7 Apr 10                         |



Free Drop & Puncture Test Data Sheet

|  |                       |
|--|-----------------------|
| Test Unit Model/Serial No.: TP18013  | Test: PUNCTURE TEST   |
| Test Date: 2 MAR 10  | Test Time: 2:22 PM    |
| Describe drop orientation and drop height:<br>ORIENTATION #2 - HIT ON PLASTIC DUST COVER<br>DROP HEIGHT IS 3.6 FEET AS INDICATED BY T10761-3.6   |                       |
| Describe impact (location, rotation, etc.):<br>DIRECT HIT ON PLASTIC DUST COVER  |                       |
| Describe on-site inspection (damage, broken parts, etc.):<br>NO ADDITIONAL DAMAGE FOUND.   |                       |
| On-site test assessment: <ul style="list-style-type: none"><li>• Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan? <u>Yes</u> or No.</li><li>• Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test? <u>Yes</u> or No.</li><li>• Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations. Yes or <u>No</u>. If yes, then identify and justify.</li><li>• Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <u>No</u>.</li><li>• Should testing continue with this test specimen? Yes or <u>No</u>. If yes, next test: _____</li><li>• Will the test specimen pass the thermal test based on the accumulated damage assessment? <u>Yes</u> or No</li></ul> |                       |
| Engineering: <u>SD 2 MAR 10</u> Regulatory: <u>LP 1 Apr 10</u> QA: <u>CMR 7 Apr 10</u>   |                       |
| Describe any post-test disassembly and inspection: PLASTIC DUST COVER WEDGED IN PLACE. LOCK COVER PINS SHEARED OFF. REAR PLATE + BOLTS INTACT. CANNOT UNLOCK.  |                       |
| Describe any change in source position (if possible):<br>SLIGHT SOURCE LOCATION CHANGE   |                       |
| Describe results of radiography (if performed):<br>NOT PERFORMED.  |                       |
| Completed by: <u>S. Gherini</u>  | Date: <u>3 MAR 10</u> |



Test Inspection Data Sheet

|   |   |
|---|---|
| Test Specimen Serial No.: <b>TP180B</b>   | Last Test Performed: <b>PUNCTURE TEST</b> |
| Describe and measure (if appropriate) any damage or broken parts, etc.:<br><b>ABOUT 1/3 OF REAR ACCESS PORT TUBE CRUSHED INTO THE DUST COVER ON THE REAR PLATE ASSEMBLY.</b>  |   |
| Describe and measure (if appropriate) any signs of permanent strain or deformation:<br><b>REAR ACCESS PORT TUBE FLATTENED AND CUTTING INTO DUST COVER.</b>  |   |
| Describe the condition of the simulated source wire assembly.<br><b>NO VISIBLE SIGNS OF DAMAGE TO SIMULATED SOURCE WIRE</b>   |   |
| Reassemble the package using a representative active source, making sure that the source position and the package configuration is the same as they were immediately after the last test.   |   |
| Measure and record a radiation profile of each test specimen in accordance with QSA Global Work Instruction WI-Q-1806.  |   |
| Compare the pre-test dose levels with post-test dose levels at the surface of the package and at 1 meter from the surface of the package.<br><b>A NEGLIGIBLE DIFFERENCE BETWEEN PRE AND POST DOSE LEVELS ON THE SURFACE AND 1 METER FROM SURFACE OF TESTED PACKAGE.</b> |   |
| Is a radiograph required to inspect for hidden component damage or failure? If radiography is performed, describe any damage or failures found.<br><b>NOT PERFORMED.</b>  |   |
| Completed by: <b>S. Green</b>   | Date: <b>8 MAR 10</b>                     |



### Free Drop & Puncture Test Checklist

|   |   |                           |
|---|---|---------------------------|
| Test:   | 30-Foot Free Drop Test  |                           |
| Test Location:  | QSA Global Burlington MA  |                           |
|   | Step  | Data                      |
| 1. Record test specimen serial number:  | TP180C  |                           |
| 2. Record the test specimen weight:   | 652 LBS.  |                           |
| 3. Record the ambient temperature:  | 47°F  | Instrument S/N:<br>ENG-20 |
| 4. Identify set-up orientation figure:  | ORIENTATION #3 (BUT #4 HIT RESULT)<br>HIT SIDE OF SHELL ON LONGITUDINAL SEAM. |                           |
| 5. Record drop height.  | 32.2 FT<br>USED T10761-322<br>S/N: TP180-3                                    |                           |
| 6. Photograph set-up in at least two perpendicular planes.  |   |                           |
| 7. Begin video recording of the test so that impact is recorded.  |   |                           |
| 8. Release the test specimen.   |   |                           |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.   |   |                           |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.   |   |                           |
| <p>THE EDGE SEAM AT THE LONGITUDINAL SEAM INTERSECTION IS COMPLETELY FLATTENED. THIS CREATES A BULGE ON THE BOTTOM ENDPLATE AND CYLINDER SURFACES. THIS IMPACT POINT WAS ORIGINALLY PLANNED FOR TEST SPECIMEN TP180D. THIS TEST SPECIMEN (TP180C) TO BE DROPPED AGAIN TO HIT LONGITUDINAL SEAM.</p> |   |                           |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach.  |   |                           |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the 30-foot drop test requirements of 10 CFR Part 71.  |   |                           |
| <input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the 30-foot drop test requirements of 10 CFR Part 71.   |   |                           |
| Test witnessed by (Signature)   | Print Name  | Date                      |
| Engineering: S. Gomi  | S. GRENIER  | 2/2/10                    |
| Regulatory Affairs: L. P. Loh   | L. P. Loh   | 1 April                   |
| Quality Assurance: C. Rougman   | C. Rougman  | 7 April                   |



Free Drop & Puncture Test Data Sheet

|  |                         |
|--|-------------------------|
| Test Unit Model/Serial No.: TP180C   | Test: 30-FOOT FREE DROP |
| Test Date: 2 MAR 10  | Test Time: 1:26 PM      |
| Describe drop orientation and drop height:<br>ORIENTATION #3 BUT ENDED UP HITTING IN ORIENTATION #4. EDGE SEAM.<br>DROP HEIGHT IS 32.2 FEET INDICATED BY T10761-32.2   |                         |
| Describe impact (location, rotation, etc.):<br>IMPACT ON EDGE SEAM OF SHELL (ORIENTATION #4)<br>SPECIMEN ROTATED FROM LONGITUDINAL SIDE TO EDGE SIDE OF SHELL.   |                         |
| Describe on-site inspection (damage, broken parts, etc.):<br>LARGE DENT ON EDGE SEAM NEAR LONGITUDINAL SEAM.   |                         |
| On-site test assessment:   |                         |
| <ul style="list-style-type: none"><li>Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan?<br/><input checked="" type="checkbox"/> Yes or No. FOR ORIENTATION #4 (TP180D)</li><li>Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test?<br/><input checked="" type="checkbox"/> Yes or No.</li><li>Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations.<br/>Yes or <input checked="" type="checkbox"/> No. If yes, then identify and justify.</li><li>Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <input checked="" type="checkbox"/> No</li><li>Should testing continue with this test specimen? <input checked="" type="checkbox"/> Yes or No. If yes, next test: REPEAT 30-FOOT DROP</li><li>Will the test specimen pass the thermal test based on the accumulated damage assessment? <input checked="" type="checkbox"/> Yes or No</li></ul> |                         |
| Engineering: <input checked="" type="checkbox"/> 2 MAR 10 Regulatory: <input checked="" type="checkbox"/> 1 APR 10 QA: <input checked="" type="checkbox"/> 7 MAR 10  |                         |
| Describe any post-test disassembly and inspection:<br>SEE PUNCTURE TEST DATA SHEET.  |                         |
| Describe any change in source position (if possible):<br>SOURCE LOCATION MOVED ABOUT 1/32 INCH TO REAR.  |                         |
| Describe results of radiography (if performed):<br>NOT PERFORMED.  |                         |
| Completed by: S. Gumi  | Date: 3 MAR 10          |



### Free Drop & Puncture Test Checklist

|  |  |                                  |
|--|--|----------------------------------|
| Test:  | 30-Foot Free Drop Test                           |                                  |
| Test Location:   | QSA Global Burlington MA                         |                                  |
|  | Step   | Data                             |
| 1. Record test specimen serial number:   | TP180C (2ND DROP)                                |                                  |
| 2. Record the test specimen weight:  | 652 LBS  |                                  |
| 3. Record the ambient temperature:   | 47°F   | Instrument S/N:<br>ENG-20        |
| 4. Identify set-up orientation figure:   | ORIENTATION #3<br>HIT SIDE OF SHELL ON LONG SEAM |                                  |
| 5. Record drop height.   | 32.2 FT  | USED T10761-32.2<br>S/N: TP180-4 |
| 6. Photograph set-up in at least two perpendicular planes.   |  |                                  |
| 7. Begin video recording of the test so that impact is recorded.   |  |                                  |
| 8. Release the test specimen.  |  |                                  |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.  |  |                                  |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.  |  |                                  |
| <u>LONGITUDINAL WELD SEAM FLATTENED TOWARD CENTER</u><br><u>OF SHELL</u>   |  |                                  |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach. |  |                                  |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the 30-foot drop test requirements of 10 CFR Part 71.                                   |  |                                  |
| <input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the 30-foot drop test requirements of 10 CFR Part 71.                                      |  |                                  |
| Test witnessed by (Signature)  | Print Name                                       | Date                             |
| Engineering: <i>S. Grenier</i>   | S. GRENIER                                       | 2 MAR 10                         |
| Regulatory Affairs: <i>L. Podolski</i>   | L. Podolski                                      | 1 Apr 10                         |
| Quality Assurance: <i>C. Loughan</i>   | C Loughan  | 7 Apr 10                         |



Free Drop & Puncture Test Data Sheet

|   |  |
|---|--|
| Test Unit Model/Serial No.: TP180C  | Test: 30-FOOT FREE DROP (2ND DROP)                     |
| Test Date: 2 MAR 10   | Test Time: 1:47 PM                                     |
| Describe drop orientation and drop height:<br>ORIENTATION #3. HIT ON LONGITUDINAL WELD SEAM - SIDE OF SHELL.<br>DROP HEIGHT IS 32.2 FEET AS INDICATED BY T10761-32.2  |  |
| Describe impact (location, rotation, etc.):<br>IMPACT LOCATION IS DIRECTLY ON THE LONGITUDINAL WELD SEAM.<br>NO ROTATION OR TILT.   |  |
| Describe on-site inspection (damage, broken parts, etc.):<br>THE LONGITUDINAL WELD SEAM SURFACE IS FLATTENED INTO THE<br>CYLINDRICAL SHELL. THE BULGE PRODUCED EARLIER IS NOW SMALLER.  |  |
| On-site test assessment: <ul style="list-style-type: none"><li>• Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan? <u>Yes</u> or No.</li><li>• Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test? <u>Yes</u> or No.</li><li>• Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations. Yes or <u>No</u>. If yes, then identify and justify.</li><li>• Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <u>No</u>.</li><li>• Should testing continue with this test specimen? <u>Yes</u> or No. If yes, next test: <u>PUNCTURE DROP</u></li><li>• Will the test specimen pass the thermal test based on the accumulated damage assessment? <u>Yes</u> or No</li></ul> |  |
| Engineering: <u>(S) 2 MAR 10</u>  | Regulatory: <u>AR</u> 1 APR 10 QA: <u>AMR</u> 7 APR 10 |
| Describe any post-test disassembly and inspection:<br><u>SEE PUNCTURE TEST DATA SHEET</u>   |  |
| Describe any change in source position (if possible):<br><u>SOURCE LOCATION MOVED ABOUT 1/32 INCH TOWARDS REAR.</u>   |  |
| Describe results of radiography (if performed):<br><u>NOT PERFORMED.</u>  |  |
| Completed by: <u>S. Gurni</u>   | Date: <u>3 MAR 10</u>                                  |



### Free Drop & Puncture Test Checklist

|  |  |                           |
|--|--|---------------------------|
| Test:  | Puncture Test  |                           |
| Test Location:   | QSA Global Burlington MA                                   |                           |
|  | Step   | Data                      |
| 1. Record test specimen serial number:   | TP180 C  |                           |
| 2. Record the test specimen weight:  | 652 LBS.   |                           |
| 3. Record the ambient temperature:   | 44 °F  | Instrument S/N:<br>ENG-20 |
| 4. Identify set-up orientation figure:   | ORIENTATION #4.<br>HIT ON SHELL EDGE AT LONGITUDINAL SEAM. |                           |
| 5. Record drop height.   | 3.6 FEET<br>USED T10761-3.6<br>S/N: TP180-16               |                           |
| 6. Photograph set-up in at least two perpendicular planes.   |  |                           |
| 7. Begin video recording of the test so that impact is recorded.   |  |                           |
| 8. Release the test specimen.  |  |                           |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.  |  |                           |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.  |  |                           |
| SURFACE DENT AT EDGE WELD SEAM.  |  |                           |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach. |  |                           |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the puncture test requirements of 10 CFR Part 71.                                       |  |                           |
| <input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the puncture test requirements of 10 CFR Part 71.  |  |                           |
| Test witnessed by (Signature)  | Print Name   | Date                      |
| Engineering: S. Gurni  | S. GURNIGI   | 2/25/10                   |
| Regulatory Affairs: L. P. L. K.  | L. P. L. K.  | 1 Apr 10                  |
| Quality Assurance: C. Roughton   | C. Roughton  | 7 Apr 10                  |



Free Drop & Puncture Test Data Sheet

|  |  |
|--|--|
| Test Unit Model/Serial No.: TP180C   | Test: Puncture Test  |
| Test Date: 2 MAR 10  | Test Time: 3:55 PM   |
| Describe drop orientation and drop height:<br>ORIENTATION #4 - HIT ON SHELL EDGE SEAM AT LONGITUDINAL WELD SEAM.<br>DROP HEIGHT IS 3.6 FEET INDICATED BY T10761-3.6  |  |
| Describe impact (location, rotation, etc.):<br>DIRECT HIT AT IMPACT LOCATION<br>NO FOR TEST SPECIMEN BACK FLIPPED OFF PUNCTURE BILLET ONTO GROUND.   |  |
| Describe on-site inspection (damage, broken parts, etc.):<br>SHALLOW DENT AT IMPACT LOCATION CAUSED BY PUNCTURE BILLET.  |  |
| On-site test assessment:   |  |
| <ul style="list-style-type: none"><li>Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan?<br/><input checked="" type="radio"/> Yes or No.</li><li>Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test?<br/><input checked="" type="radio"/> Yes or No.</li><li>Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations.<br/>Yes or <input checked="" type="radio"/> No. If yes, then identify and justify.</li><li>Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <input checked="" type="radio"/> No</li><li>Should testing continue with this test specimen? Yes or <input checked="" type="radio"/> No. If yes, next test: _____</li><li>Will the test specimen pass the thermal test based on the accumulated damage assessment? <input checked="" type="radio"/> Yes or No</li></ul> |  |
| Engineering: <input checked="" type="radio"/> ZMM10  | Regulatory: <input checked="" type="radio"/> 1 Apr 10 QA: OML 7 Apr 10 |
| Describe any post-test disassembly and inspection: ALL REARPLATE HARDWARE INTACT.<br>POSSIBLE FUNCTIONS WORKING, SLIGHT OBSTRUCTION PROJECTING SOURCE. SOURCE TUBE BROKEN.   |  |
| Describe any change in source position (if possible): SHIELD SHIFTED TO SIDE ABOUT 1/4 INCH.<br>NO CHANGE IN SOURCE LOCATION.  |  |
| Describe results of radiography (if performed):<br>NOT PERFORMED.  |  |
| Completed by: S. Giani   | Date: 3 MAR 10   |



Test Inspection Data Sheet

|  |   |
|--|---|
| Test Specimen Serial No.: <b>TP180C</b>  | Last Test Performed: <b>PUNCTURE TEST</b> |
| Describe and measure (if appropriate) any damage or broken parts, etc.:<br><b>ABOUT A 1.5 INCH HIGH BULGE ON TOP END OF PACKAGE<br/>SOURCE TUBE BROKEN OFF AT REAR PLATE END.<br/>SHIELD SHIFTED INSIDE PACKAGE ABOUT 0.3 INCHES TOWARDS<br/>LONGITUDINAL WELD SEAM.</b>   |   |
| Describe and measure (if appropriate) any signs of permanent strain or deformation:<br><b>~ 1.5 INCH BULGE ON TOP END PLATE<br/>- COPPER SHIELD BARRIER AT REAR PORT BENT TOWARDS<br/>IMPACT TARGET #2 (LONGITUDINAL WELD SEAM).</b>                                       |   |
| Describe the condition of the simulated source wire assembly.<br><b>NO VISIBLE SIGNS OF DAMAGE TO SIMULATED SOURCE WIRE</b>  |   |
| Reassemble the package using a representative active source, making sure that the source position and the package configuration is the same as they were immediately after the last test.  |   |
| Measure and record a radiation profile of each test specimen in accordance with QSA Global Work Instruction WI-Q-1806.   |   |
| Compare the pre-test dose levels with post-test dose levels at the surface of the package and at 1 meter from the surface of the package.<br><b>NEGLECTIBLE DIFFERENCE BETWEEN PRE AND POST DOSE<br/>LEVELS ON SURFACE AND 1 METER FROM SURFACE OF<br/>TESTED PACKAGE.</b> |   |
| Is a radiograph required to inspect for hidden component damage or failure? If radiography is performed, describe any damage or failures found.<br><b>NOT PERFORMED.</b>   |   |
| Completed by: <b>S. Gamm</b>   | Date: <b>10 MAR 10</b>                    |



### Free Drop & Puncture Test Checklist

|  |  |                                  |
|--|--|----------------------------------|
| Test:  | 30-Foot Free Drop Test                         |                                  |
| Test Location:   | QSA Global Burlington MA                       |                                  |
|  | Step   | Data                             |
| 1. Record test specimen serial number:   | TP180 E  |                                  |
| 2. Record the test specimen weight:  | 659 LBS  |                                  |
| 3. Record the ambient temperature:   | 48 °F  | Instrument S/N:<br>ENG-20        |
| 4. Identify set-up orientation figure:   | ORIENTATION # 5.<br>TOP SURFACE OF WELDED BODY |                                  |
| 5. Record drop height.   | 32.2 FT  | USED T10761-32.2<br>S/N: TP180-1 |
| 6. Photograph set-up in at least two perpendicular planes. ✓   |  |                                  |
| 7. Begin video recording of the test so that impact is recorded. ✓   |  |                                  |
| 8. Release the test specimen. ✓  |  |                                  |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.  |  |                                  |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.  |  |                                  |
| <p>TOP EDGE OF WELDED BODY DENTED NEAR THE FRONT ACCESS PORT.</p>  |  |                                  |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach. |  |                                  |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the 30-foot drop test requirements of 10 CFR Part 71.                                   |  |                                  |
| <input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the 30-foot drop test requirements of 10 CFR Part 71.                                      |  |                                  |
| Test witnessed by (Signature)  | Print Name                                     | Date                             |
| Engineering: <i>S. Green</i>   | S. GREENISE                                    | 2 MAR 10                         |
| Regulatory Affairs: <i>L. P. Clark</i>   | L. P. Clark                                    | 1 Apr 10                         |
| Quality Assurance: <i>C. Rouph</i>   | C. Rouph                                       | 7 Apr 10                         |



Free Drop & Puncture Test Data Sheet

|   |                         |
|---|-------------------------|
| Test Unit Model/Serial No.: TP180E  | Test: 30-FOOT FREE DROP |
| Test Date: 2 MAR 10   | Test Time: 10:14 AM     |
| Describe drop orientation and drop height:<br>ORIENTATION #5. IMPACT ON TOP SURFACE OF WELDED BODY.<br>DROP HEIGHT IS 32.2 FEET INDICATED WITH T10761-32.2  |                         |
| Describe impact (location, rotation, etc.):<br>IMPACT ON TOP SURFACE OF WELDED BODY.<br>SLIGHT ROTATION WITH FRONT ACCESS PORT LOWER UPON IMPACT.   |                         |
| Describe on-site inspection (damage, broken parts, etc.):<br>ABOUT AN 8-INCH DENT ON RIM OF WELDED CYLINDER NEAR THE FRONT ACCESS PORT.   |                         |
| On-site test assessment: <ul style="list-style-type: none"><li>Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan? <u>Yes</u> or No.</li><li>Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test? <u>Yes</u> or No.</li><li>Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations. Yes or <u>No</u>. If yes, then identify and justify.</li><li>Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <u>No</u></li><li>Should testing continue with this test specimen? <u>Yes</u> or No. If yes, next test: PUNCTURE TEST</li><li>Will the test specimen pass the thermal test based on the accumulated damage assessment? <u>Yes</u> or No</li></ul> |                         |
| Engineering: <u>2 MAR 10</u> Regulatory: <u>27 APR 10</u> QA: <u>27 APR 10</u>  |                         |
| Describe any post-test disassembly and inspection:<br>SEE PUNCTURE TEST DATA SHEET  |                         |
| Describe any change in source position (if possible):<br>SOURCE LOCATION MOVE ABOUT 1/16 INCH TOWARDS FRONT PLATE END.  |                         |
| Describe results of radiography (if performed):<br>NOT PERFORMED.   |                         |
| Completed by: S. Gorman   | Date: 3 MAR 10          |



### Free Drop & Puncture Test Checklist

|   |  |                           |
|---|--|---------------------------|
| Test:   | Puncture Test                                |                           |
| Test Location:  | QSA Global Burlington MA                     |                           |
|   | Step   | Data                      |
| 1. Record test specimen serial number:  | TP180 E                                      |                           |
| 2. Record the test specimen weight:   | 659 LBS.                                     |                           |
| 3. Record the ambient temperature:  | 45°F   | Instrument S/N:<br>ENG-20 |
| 4. Identify set-up orientation figure:  | ORIENTATION # 1<br>HIT ON DUST COVER         |                           |
| 5. Record drop height.  | 3.6 FEET<br>USCD T10761-3.6<br>S/N: TP180-11 |                           |
| 6. Photograph set-up in at least two perpendicular planes.  |  |                           |
| 7. Begin video recording of the test so that impact is recorded.  |  |                           |
| 8. Release the test specimen.   |  |                           |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.   |  |                           |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.   |  |                           |
| <u>TEST SPECIMEN DROPPED TWICE</u><br><u>1. HIT ACCESS PORT TUBE ON 1ST TRY. - DENT ON PORT.</u><br><u>2. HIT ON DUST COVER 2ND TRY - DUST COVER SLIGHTLY</u><br><u>COMPRESSED INTO ACCESS PORT.</u>  |  |                           |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach.  |  |                           |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the puncture test requirements of 10 CFR Part 71.<br><br><input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the puncture test requirements of 10 CFR Part 71. |  |                           |
| Test witnessed by (Signature)   | Print Name                                   | Date                      |
| Engineering: <i>S. Gurni</i>  | S. GURNIER                                   | 2/11/10                   |
| Regulatory Affairs: <i>L. P. Delab</i>  | L. P. Delab                                  | 1 Apr 10                  |
| Quality Assurance: <i>C. Roughan</i>  | C. Roughan                                   | 7 Apr 10                  |



### Free Drop & Puncture Test Data Sheet

|  |   |
|--|---|
| Test Unit Model/Serial No.: <b>TP120 E</b>   | Test: <b>Puncture Test</b>                              |
| Test Date: <b>2 MAR 10</b>   | Test Time: <b>A1: 3:11 PM A2: 5:34 PM</b>               |
| Describe drop orientation and drop height:<br><b>ORIENTATION #1 - HIT ONTO DUST COVER.</b><br><b>DROP HEIGHT IS 3.6 FEET INDICATED BY T10761-3.6</b>   |   |
| Describe impact (location, rotation, etc.):<br><b>2ND IMPACT ON FACE OF DUST COVER</b><br><b>TEST SPECIMEN ROTATED OFF PUNCTURE BILLET AFTER SLIGHT BOUNCE.</b>  |   |
| Describe on-site inspection (damage, broken parts, etc.):<br><b>PLASTIC DUST COVER COMPRESSED INTO ACCESS PORT.</b><br><b>NO BROKEN PARTS.</b>   |   |
| On-site test assessment:   |   |
| <ul style="list-style-type: none"> <li>Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan? <b>Yes</b> or No.</li> <li>Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test? <b>Yes</b> or No.</li> <li>Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations. <b>Yes</b> or <b>No</b> If yes, then identify and justify.</li> <li>Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? <b>Yes</b> or <b>No</b></li> <li>Should testing continue with this test specimen? <b>Yes</b> or <b>No</b> If yes, next test: _____</li> <li>Will the test specimen pass the thermal test based on the accumulated damage assessment? <b>Yes</b> or No</li> </ul> |   |
| Engineering: <b>SD 2 MAR 10</b>  | Regulatory: <b>RA 1 Apr 10</b> QA: <b>UM R 7 MAR 10</b> |
| Describe any post-test disassembly and inspection: <b>ALL REAR PLATE HARDWARE INTACT.</b><br><b>POSILOCK WORKS, BUT SLIDE STICKS. DUMMY SOURCE WIRE PROJECS AND IS UNAFFECTED.</b>   |   |
| Describe any change in source position (if possible): <b>SOURCE TUBE DEFORMED INTO OVAL SHAPE.</b><br><b>SOURCE LOCATION MOVED APPROXIMATELY 1/16 (0.06) INCH.</b>   |   |
| Describe results of radiography (if performed):<br><b>NOT PERFORMED.</b>   |   |
| Completed by: <b>S. Gami</b>   | Date: <b>3 MAR 10</b>                                   |



Test Inspection Data Sheet

|   |  |
|---|--|
| Test Specimen Serial No.: <b>TP180E</b>   | Last Test Performed: <b>PUNCTURE TEST #2</b> |
| Describe and measure (if appropriate) any damage or broken parts, etc.:<br><b>- ABOUT A 10 INCH LONG DENT ON CORNER EDGE OF TOP END PLATE</b><br><b>- REAR ACCESS PORT TUBE DENTED IN TOWARDS CENTER ~ 1 INCH.</b>  |  |
| Describe and measure (if appropriate) any signs of permanent strain or deformation:<br><b>- SEE ABOVE</b>   |  |
| Describe the condition of the simulated source wire assembly.<br><b>NO VISIBLE SIGNS OF DAMAGE TO SIMULATED SOURCE WIRE</b>   |  |
| Reassemble the package using a representative active source, making sure that the source position and the package configuration is the same as they were immediately after the last test.   |  |
| Measure and record a radiation profile of each test specimen in accordance with QSA Global Work Instruction WI-Q-1806.  |  |
| Compare the pre-test dose levels with post-test dose levels at the surface of the package and at 1 meter from the surface of the package.<br><b>NEGLECTIBLE DIFFERENCE BETWEEN PRE AND POST DOSE LEVELS</b><br><b>ON SURFACE AND AT 1 METER FROM SURFACE OF TESTED PACKAGE.</b> |  |
| Is a radiograph required to inspect for hidden component damage or failure? If radiography is performed, describe any damage or failures found.<br><b>NOT PERFORMED.</b>  |  |
| Completed by: <b>S. Gumi</b>  | Date: <b>10 MAR 10</b>                       |



### Free Drop & Puncture Test Checklist

|   |   |                           |
|---|---|---------------------------|
| Test:   | 30-Foot Free Drop Test                        |                           |
| Test Location:  | QSA Global Burlington MA                      |                           |
|   | Step  | Data                      |
| 1. Record test specimen serial number:  | TP180 G                                       |                           |
| 2. Record the test specimen weight:   | 728 LBS.                                      |                           |
| 3. Record the ambient temperature:  | 48°F  | Instrument S/N:<br>ENG-20 |
| 4. Identify set-up orientation figure:  | ORIENTATION #5.<br>HIT ON BOTTOM RIB SURFACE. |                           |
| 5. Record drop height.  | 32.2 FEET USED T10761-32.2<br>S/N: TP180-6    |                           |
| 6. Photograph set-up in at least two perpendicular planes.  |   |                           |
| 7. Begin video recording of the test so that impact is recorded.  |   |                           |
| 8. Release the test specimen.   |   |                           |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.   |   |                           |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.   |   |                           |
| <p>ONE LOAD PIN AND FOUR RIB MOUNTING BOLTS FAILED IN SHEAR.<br/>         BOTTOM RIBS ARE BENT AND CRACKED.<br/>         BASIC PACKAGE CONFIGURATION INTACT AND UNAFFECTED EXCEPT<br/>         FOR ONE SMALL SHALLOW CUT INTO AN EDGE WELD AND THE SHELL<br/>         CAUSED BY THE RIB COMPRESSING INTO THE SHELL.</p> |   |                           |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach.  |   |                           |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the 30-foot drop test requirements of 10 CFR Part 71.  |   |                           |
| <input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the 30-foot drop test requirements of 10 CFR Part 71.   |   |                           |
| Test witnessed by (Signature)   | Print Name                                    | Date                      |
| Engineering: S. GRENIER   | S. GRENIER                                    | 2/11/10                   |
| Regulatory Affairs: L. P. DILCH   | L. P. DILCH                                   | 1 April                   |
| Quality Assurance: C. ROUGHAN   | C. ROUGHAN                                    | 7 April                   |



Free Drop & Puncture Test Data Sheet

|  |   |
|--|---|
| Test Unit Model/Serial No.: TP180G   | Test: 30-FOOT FREE DROP                               |
| Test Date: 2 MAR 10  | Test Time: 2:04 PM                                    |
| Describe drop orientation and drop height:<br>ORIENTATION # 5 EXCEPT TARGETING BOTTOM (NOT INVERTED)<br>DROP HEIGHT IS 32.2 FEET AS INDICATED BY T10761-32.2   |   |
| Describe impact (location, rotation, etc.):<br>IMPACT LOCATION ON BOTTOM RIBS.<br>SLIGHT ROTATION CAUSED TWO RIBS TO HIT FIRST.  |   |
| Describe on-site inspection (damage, broken parts, etc.):<br>BROKEN LOAD PIN (1) AND RIB BOLTS (4). RIBS BENT AND CRACKED.<br>BASIC PACKAGE WORKS UNAFFECTED.  |   |
| On-site test assessment: <ul style="list-style-type: none"><li>• Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan? <u>Yes</u> or No.</li><li>• Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test? <u>Yes</u> or No.</li><li>• Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations. Yes or <u>No</u>. If yes, then identify and justify.</li><li>• Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <u>No</u>.</li><li>• Should testing continue with this test specimen? Yes or <u>No</u>. If yes, next test: _____</li><li>• Will the test specimen pass the thermal test based on the accumulated damage assessment? <u>Yes</u> or No</li></ul> |   |
| Engineering: <u>SD 2/24/10</u>   | Regulatory: <u>AP 7 Apr 10</u> QA: <u>MA 7 Apr 10</u> |
| Describe any post-test disassembly and inspection:<br>ALL HANDING RIBS REMOVED AND STORED.   |   |
| Describe any change in source position (if possible):<br>SOURCE LOCATION MOVED ABOUT 0.06 INCHES TOWARDS REAR PART.  |   |
| Describe results of radiography (if performed):<br>NOT PERFORMED   |   |
| Completed by: <u>S. GREEN</u>  | Date: <u>3 MAR 10</u>                                 |



### Free Drop & Puncture Test Checklist

|   |   |                                  |
|---|---|----------------------------------|
| Test:   | 30-Foot Free Drop Test                              |                                  |
| Test Location:  | QSA Global Burlington MA                            |                                  |
|   | Step  | Data                             |
| 1. Record test specimen serial number:  | TP180G (WITH RIBS REMOVED)                          |                                  |
| 2. Record the test specimen weight:   | 661 LBS.  |                                  |
| 3. Record the ambient temperature:  | 66°F  | Instrument S/N:<br>ENG-20        |
| 4. Identify set-up orientation figure:  | ORIENTATION #5<br>HIT DIRECTLY ON TOP PLATE SURFACE |                                  |
| 5. Record drop height.  | 32.2 FEET   | USED T10761-32.2<br>S/N: TP180-9 |
| 6. Photograph set-up in at least two perpendicular planes.  |   |                                  |
| 7. Begin video recording of the test so that impact is recorded.  |   |                                  |
| 8. Release the test specimen.   |   |                                  |
| 9. Stop the video recorder. Ensure the point of impact and orientation specified in the plan has been achieved.   |   |                                  |
| 10. Record the damage to the test specimen. Use a separate sheet and attach, if needed.   |   |                                  |
| <u>NO DAMAGE TO WELDED BODY. ALL BOLTS AND STUDS INTACT.</u><br><u>OUTLET PORT KNOB MISSING. KNOB FOUND ~ 2 FEET AWAY AND APPEARS TO HAVE BRASS SHAFT SHEARED OFF.</u>  |   |                                  |
| 11. Engineering, Regulatory Affairs and Quality Assurance makes a preliminary assessment relative to 10 CFR 71. If needed, record the assessment on a separate sheet and attach.  |   |                                  |
| <input checked="" type="checkbox"/> Preliminary assessment indicates test specimen meets the 30-foot drop test requirements of 10 CFR Part 71.<br><input type="checkbox"/> Preliminary assessment indicates test specimen does not meet the 30-foot drop test requirements of 10 CFR Part 71. |   |                                  |
| Test witnessed by (Signature)   | Print Name  | Date                             |
| Engineering: <i>S. Green</i>  | STEVE GREEN   | 19 MAR 2010                      |
| Regulatory Affairs: <i>L. P. ...</i>  | L. P. ...   | 1 Apr 10                         |
| Quality Assurance: <i>C. ...</i>  | C. ...  | 7 April                          |



### Free Drop & Puncture Test Data Sheet

|   |  |
|---|--|
| Test Unit Model/Serial No.: TP180G *  | Test: 30-Foot Free Drop  |
| Test Date: 19 MAR 2010  | Test Time: 11:02 AM  |
| Describe drop orientation and drop height:<br>ORIENTATION #5. IMPACT ON TOP SURFACE OF WELDED BODY.<br>DROP HEIGHT IS 32.2 FEET INDICATED BY T10761-322   |  |
| Describe impact (location, rotation, etc.):<br>IMPACT SQUARELY ON TOP FLAT SURFACE OF WELDED BODY<br>PACKAGE BOUNCED STRAIGHT UP THEN FLIPPED AND LANDED INVERTED.  |  |
| Describe on-site inspection (damage, broken parts, etc.):<br>IMPACT IMPRINT ON TOP SURFACE OF BODY.<br>OUTLET PORT (FRONT PLATE) KNOB MISSING AND FOUND 2 FEET AWAY.  |  |
| On-site test assessment:  |  |
| <ul style="list-style-type: none"> <li>Was the test performed in accordance with 10 CFR 71, IAEA TS-R-1 1996, and this test plan?<br/><input checked="" type="radio"/> Yes or <input type="radio"/> No.</li> <li>Does the test specimen meet the requirements of 10 CFR 71 and IAEA TS-R-1 1996 for this test?<br/><input checked="" type="radio"/> Yes or <input type="radio"/> No.</li> <li>Any changes to subsequent drop orientations needed to achieve maximum damage? Especially for the SENTRY 330 Standard, SENTRY 330 Special, and SENTRY Source Changer configurations.<br/>Yes or <input checked="" type="radio"/> No If yes, then identify and justify.</li> <li>Did sufficient damage occur at or on the rear-plate attachment area to warrant further drop testing the SENTRY 110 Projector - Basic configuration because of its thinner rear-plate? Yes or <input checked="" type="radio"/> No</li> <li>Should testing continue with this test specimen? Yes or <input checked="" type="radio"/> No If yes, next test: _____</li> <li>Will the test specimen pass the thermal test based on the accumulated damage assessment? <input checked="" type="radio"/> Yes or <input type="radio"/> No</li> </ul> |  |
| Engineering: <input checked="" type="radio"/> AMM10   | Regulatory: <input checked="" type="radio"/> 7 Apr 10 QA: <input checked="" type="radio"/> AMM10 |
| Describe any post-test disassembly and inspection:<br>FRONT AND REAR PLATES REMOVED AND INSPECTED - SEE PHOTOS.   |  |
| Describe any change in source position (if possible):<br>NO CHANGE IN SOURCE LOCATION.  |  |
| Describe results of radiography (if performed):<br>NOT PERFORMED.   |  |
| Completed by: S. Green  | Date: 19 MAR 10  |

\* WITH RIBS REMOVED.



Test Inspection Data Sheet

|   |   |
|---|---|
| Test Specimen Serial No.:<br>TP180G   | Last Test Performed:<br>30-FOOT DROP (#1) |
| Describe and measure (if appropriate) any damage or broken parts, etc.: <ul style="list-style-type: none"><li>- MULTIPLE BROKEN RIB MOUNTING FASTENERS</li><li>- BOTTOM RIBS SHOW CRACKING AND SPLITTING</li><li>- SHALLOW CUT INTO BODY CAUSED BY RIBS PRESSING INWARDS.</li></ul> |   |
| Describe and measure (if appropriate) any signs of permanent strain or deformation: <ul style="list-style-type: none"><li>- 4 MOUNTING FACES FOR RIBS SHOW SHALLOW IMPRINT ~ .03<br/>INCH<br/>DEEP.</li></ul>   |   |
| Describe the condition of the simulated source wire assembly.<br><br>NO SIGNS OF DAMAGE TO SIMULATED SOURCE ASSEMBLY  |   |
| Reassemble the package using a representative active source, making sure that the source position and the package configuration is the same as they were immediately after the last test.   |   |
| Measure and record a radiation profile of each test specimen in accordance with QSA Global Work Instruction WI-Q-1806.  |   |
| Compare the pre-test dose levels with post-test dose levels at the surface of the package and at 1 meter from the surface of the package.<br><br>POST TEST MEASUREMENTS TAKEN AFTER SECOND 30-FOOT DROP.  |   |
| Is a radiograph required to inspect for hidden component damage or failure? If radiography is performed, describe any damage or failures found.<br><br>NOT PERFORMED.   |   |
| Completed by:<br>S. Gumi  | Date:<br>16 MAR 10                        |



Test Inspection Data Sheet

|   |  |
|---|--|
| Test Specimen Serial No.: <u>TP180G</u>   | Last Test Performed: <u>30-FOOT DROP (2ND)</u> |
| Describe and measure (if appropriate) any damage or broken parts, etc.:<br><ul style="list-style-type: none"><li>- SEE 1ST 30-FOOT DROP DATA SHEET.</li><li>- FRONT PLATE PORT KNOB/COVER FRACTURED AT BRASS SHAFT</li></ul>  |  |
| Describe and measure (if appropriate) any signs of permanent strain or deformation:<br><p>SEE ABOVE.</p>  |  |
| Describe the condition of the simulated source wire assembly.<br><p>NO VISIBLE SIGNS OF DAMAGE TO SIMULATED SOURCE WIRE ASSEMBLY.</p>   |  |
| Reassemble the package using a representative active source, making sure that the source position and the package configuration is the same as they were immediately after the last test.   |  |
| Measure and record a radiation profile of each test specimen in accordance with QSA Global Work Instruction WI-Q-1806.  |  |
| Compare the pre-test dose levels with post-test dose levels at the surface of the package and at 1 meter from the surface of the package.<br><ul style="list-style-type: none"><li>- 500 mR/h DIFFERENCE BETWEEN PRE AND POST DOSE LEVELS AT SURFACE OF FRONT PLATE PORT.</li><li>- 0.5 mR/h DIFFERENCE BETWEEN PRE AND POST DOSE LEVELS AT 1 METER FROM SURFACE OF PACKAGE. (2.2 mR/h MAX)</li></ul> |  |
| Is a radiograph required to inspect for hidden component damage or failure? If radiography is performed, describe any damage or failures found.<br><p>NOT PERFORMED.</p>  |  |
| Completed by: <u>S. Gami</u>  | Date: <u>23 MAR 10</u>                         |



# Safety Analysis Report for the Models Sentry 110, Sentry 330 and 867 Transport Packages

QSA Global, Inc.  
Burlington, Massachusetts

June 2015 - Revision 3  
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## **2.12.5 Test Plan Report 72-S2 (680-OP) dated 15 February 1999 (minus Appendices A through C)**