## **Testing and Evaluation Protocol for Handheld Radionuclide Identifiers for Use in Homeland Security**

**T&E Protocol N42.34, 2010** 

Version 3.03

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### Testing and Evaluation Protocol for Hand Held Radionuclide Identifiers for use in Homeland Security

#### 1. Scope

This document establishes the protocol for testing alarming personal radiation detectors based on the performance requirements established in ANSI N42.34, "American National Standard Performance Criteria for Hand-held Instruments for the Detection and Identification of Radionuclides."

#### 2. References

This protocol shall be used in conjunction with the following documents:

- [R1] ANSI N42.34, "American National Standard Performance Criteria for Hand-held Instruments for the Detection and Identification of Radionuclides."
- [R2] ANSI/IEEE N42.42, "Data Format Standard for Radiation Detectors Used for Homeland Security."
- [R3] NIST Handbook 150:2006, NVLAP Procedures and General Requirements
- [R4] NIST Handbook 150-23:2007 (DRAFT) NVLAP Radiation Detection Instruments

#### **3.** Compliance Level Information

Instrument under test might meet all the requirements listed in the ANSI/IEEE N42.34 standard. Therefore, different agencies developed documents describing the compliance levels required for particular applications of the instruments under test. Examples of such compliance level requirements are those required by the Graduated Rad/Nuc Detector Evaluation and Reporting (GRaDER program. For this program, information can be found in the "Compliance Level for GRaDER Instrument Performance" document located at <a href="http://www.dhs.gov/GRaDER">http://www.dhs.gov/GRaDER</a>.

#### 4. Test and evaluation steps

It is recommended that testing laboratories perform the tests listed in this protocol in the following order:

- Check all items listed in the general requirements
- Perform the radiological tests
- Perform the temperature and humidity tests
- Perform the entire electrical and electromagnetic test except the Electrostatic Discharge (ESD) test
- Perform the impact and the vibration tests
- Perform the moisture and dust test
- Perform the ESD test
- Perform the drop test, as required

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Excel template sheets are provided by NIST to the testing laboratory to guarantee that all data required is being provided in the test report.

#### **5.** Recording test results

This Test and Evaluation protocol contains data sheets that shall be used to record and report all test results. Each data sheet is associated with a specific section(s) of the referenced ANSI standard, N42.34. An electronic version of the data sheets is provided in the form of spreadsheets that may be used to record and report the results of the tests. These spreadsheets were verified and validated (V&V) using Microsoft Excel 2007 (compatibility mode).

Instrument status shall be recorded on the "Test Summary" sheet as testing is performed. The comment section in each data sheet shall be used to record changes to the test requirements and methods listed in the ANSI standard. The comment section shall also include the rational of the changes.

#### **6.** Test report

A test report summarizing the results of the test shall include the following sections:

- a. Laboratory equipment information:
  - 1. Identify all participating laboratory facilities. Include points of contact names, mailing address, telephone number, and electronic mail addresses.
  - 2. Identify the tests performed in the different facilities.
  - 3. List all supporting equipment name, model number and last day of calibration used for each test.

#### b. Test equipment information:

- 1. Include manufacturer name, instrument model, instrument serial number, software and firmware version identification, and last day of calibration.
- 2. List the operating modes and parameter setting of the instrument and accessory kit(s) used in each test.

#### c. Data sheets:

- 1. The data sheets listed in this document shall be completed and provided as part of the report.
- 2. Include changes to the ANSI standard test requirements or methods and rational to the changes.

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#### 7. Guidance for testing ANSI N42.42 data format requirements

The standard associated with this Test and Evaluation Protocol requires verification that an output data file is created that complies with ANSI/IEEE N42.42 standard requirements. The range of complexity of the N42.42 compliant instrument output file is extremely broad. Data output files from these instruments are simple files that can be checked manually using a text editor such as Notepad or WordPad. These files can also be verified using additional tools. In principle, all data output files that meet ANSI N42.42 can be verified manually using a text editor as these files are XML files. File reading software, such as Altova XMLSpy® 2009 Standard Edition can also be used for manual viewing and validating of structure and content.

N42.42 schemas can be used to validate the file format as specified in the ANSI/IEEE N42.42 standard. These schemas are available at the NIST web site <a href="http://physics.nist.gov/Divisions/Div846/Gp4/ANSIN4242/xml.html">http://physics.nist.gov/Divisions/Div846/Gp4/ANSIN4242/xml.html</a>.

There are several XML validators that can be used to verify the XML structure of the N42.42 compliant instrument output file. Examples of these validators can be found at <a href="http://www.xmlvalidation.com/">http://www.xmlvalidation.com/</a> or <a href="http://validator.w3.org/">http://validator.w3.org/</a>.

#### 8. Test modifications from ANSI/IEEE N42.34-2006 requirements

Some issues were observed about the sources required for testing instruments against the ANSI/IEEE N42.34-2006 standard. These issues will require reconsidering the sources used for testing this type of instruments in the next revision of the standard. Therefore, testing laboratories are not required to test the instruments for the following list of radionuclides (Section 6.6 ANSIN42.34-2006):

- Unshielded <sup>233</sup>U
- Behind 5 mm steel shielding - $^{40}$ K,  $^{125}$ I,  $^{226}$ Ra,  $^{233}$ U,  $^{235}$ U,  $^{238}$ U, Pu (RG Pu containing  $\geq 12\%$   $^{240}$ Pu) ,  $^{241}$ Am

In addition, new considerations were taken about the enrichment of some of the sources listed in the ANSI/IEEE N42.34 standard. The testing laboratories should note that the source enrichment to be used for all the tests described in the ANSI/IEEE N42.34 standard is the following: HEU has an enrichment that is  $\geq 90\%^{235}$ U, DU at  $0.2\%^{235}$ U, and  $U_{nat}$  at  $0.7\%^{235}$ U, RGPu containing  $\geq 10\%^{240}$ Pu, and WGPu  $\leq 6\%^{240}$ Pu.

#### 9. Considerations

The standard establishes exposure rates for test in Roentgen per hour (R/h). When testing instruments that read in rem per hour, the test field shall be in rem/h instead of R/h. Refer to the "Units and Uncertainties" section in the standard for additional information.

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#### 10. "Source data" entry in data sheets

The standard requires testing with different radionuclides to establish the instrument's capability to correctly identify those radionuclides. The ANSI/IEEE N42.34 standard specified that these tests should be performed by placing the different radioactive sources in front the instrument to produce an exposure rate of 50  $\mu$ R/h at the reference point of the instrument (if reference point is marked) or at the front face of the instrument in the direction of use (if reference point is not marked). Based on these requirements, the "Source Data" entry in the data sheets should contain the following information:

- Source ID number
- Activity at reference time
- Reference time
- Activity at time of test
- Time of test
- Measured exposure rate
- Source to detector distance
- Calculated exposure rate



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|               |         |        | Summary Sl  |        |         |        |
|---------------|---------|--------|-------------|--------|---------|--------|
|               |         |        | ANSI N42.34 |        |         |        |
|               |         |        |             |        |         |        |
| Manufacturer: |         |        |             |        |         |        |
| Model:        |         | -      |             |        |         |        |
|               |         |        |             |        |         |        |
|               |         |        |             |        |         |        |
|               | Serial# |        | Serial#     |        | Serial# |        |
| est Number    | Date    | Status | Date        | Status | Date    | Status |
| 5.2           |         |        |             |        |         |        |
| 5.3           |         |        |             |        |         |        |
| 5.4           |         |        |             |        |         |        |
| 5.5           |         |        |             |        |         |        |
| 5.6           |         |        |             |        |         |        |
| 5.7           |         | 1      |             |        |         |        |
| 5.8           |         | 1      |             | 1      |         |        |
| 5.9<br>5.10   |         | 1      | -           | 1      |         |        |
| 5.10          |         | 1      |             | 1      | +       | 1      |
| 5.12          |         |        |             |        |         |        |
| 6.2           |         | 1      |             |        |         |        |
| 6.3           |         |        |             |        |         |        |
| 6.4           |         |        |             |        |         |        |
| 6.5           |         |        |             |        |         |        |
| 6.6           |         |        |             |        |         |        |
| 6.7           |         |        |             |        |         |        |
| 6.8           |         |        |             |        |         |        |
| 6.9           |         |        |             |        |         |        |
| 6.10          |         | 1      |             |        |         |        |
| 6.11          |         |        |             |        |         |        |
| 6.12<br>6.13  |         | +      | +           |        |         |        |
| 6.14          |         |        |             |        |         |        |
| 6.15          |         |        |             |        |         |        |
| 6.16          |         |        |             |        |         |        |
| 6.17          |         |        |             |        |         |        |
| 6.18          |         |        |             |        |         |        |
| 7.1           |         |        |             |        |         |        |
| 7.2           |         |        |             |        |         |        |
| 7.3           |         |        |             |        |         |        |
| 7.4           |         | ļ      |             | ļ      |         |        |
| 7.5           |         | 1      |             | 1      |         |        |
| 8.1           |         | 1      |             | 1      |         |        |
| 8.2           |         | 1      |             | 1      |         |        |
| 8.3<br>8.4    |         | 1      |             |        | +       |        |
| 8.5           |         | +      |             | 1      | +       |        |
| 9.1           |         | 1      |             | 1      |         |        |
| 9.2           |         | 1      |             |        |         |        |
| 9.3           |         |        |             |        |         |        |
| 10.0          |         |        |             |        |         |        |
|               |         |        |             |        |         |        |
|               |         |        |             |        |         |        |
| Comments:     |         |        |             |        |         |        |
|               |         |        |             |        |         |        |
|               |         |        |             |        |         |        |
|               |         |        |             |        | 1       |        |



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|  |             |        | Pre           | e-Test         |         |        |                |               |          |     |
|--|-------------|--------|---------------|----------------|---------|--------|----------------|---------------|----------|-----|
|  |             | Da     | ta She        | et and l       | ₹ерс    | ort    |                |               |          |     |
|  |             |        |               |                |         |        |                |               |          |     |
| Instrument:                                |             |        |               |                |         |        |                |               |          |     |
| Model:                                     |             |        |               |                |         |        | l Number:      |               |          |     |
| Date Performed:                            |             |        |               |                |         | Test   | Location:      |               |          |     |
| Requirement:                               | \/orifi\/ t | hat th | o manufact    | uror cupplic   | nd an o | norati | on and mair    | atonanco m    | anual    |     |
| Requirement.                               |             |        |               | ion listed be  |         | perau  | on and man     | ilenance in   | anuai    |     |
|  | ooman       | mig t  | no imormat    | ion noted be   | 71011.  |        |                |               |          |     |
| Test Protocol:                             | Reviev      | v the  | information   | n provided a   | and inc | licate | whether the    | e required in | nformati | ion |
| 1001110100011                              |             |        |               | •              |         |        | mentation is   | •             |          |     |
|  |             | -      |               | -              |         |        | not be in dr   | -             |          |     |
|  |             |        | sections.     |                |         |        |                |               |          |     |
|  |             |        |               |                |         |        |                |               |          |     |
| Note:                                      | Comm        | ents   | are require   | d when the     | require | ement  | is not verifie | d.            |          |     |
|  |             |        |               |                |         |        |                |               |          |     |
|  |             |        | Tes           | t Results      |         |        |                |               |          |     |
|  | Requ        | ıiren  | nent          |                |         |        | Yes            |               | No       |     |
|  |             |        |               |                |         |        |                |               |          |     |
| Operating instructions and r               |             | ons    |               |                |         |        |                |               |          |     |
| Electrical connection schen                | natic       |        |               |                |         |        |                |               |          | ı   |
| Spare parts list Troubleshooting guide.    |             |        |               |                |         |        |                |               |          |     |
| Description and protocol for               | comm        | unica  | ation metho   | nde of trane   | mitting | n and  | <u></u>        |               |          |     |
| receiving data                             | COIIIII     | uiiice | ation metric  | or trains      |         | gana   |                |               | ]        |     |
| Contact information for the r              | manufa      | cture  | er includina  | name, add      | ress.   |        |                |               |          |     |
| telephone #, fax #, email ad               |             |        | 3             | ,              | ,       |        | H              |               | H        |     |
| Power supply requirements                  |             |        |               |                |         |        | Ш              |               |          |     |
| Recommended operational                    | parame      | eters  | such as: d    | etector res    | ponse   | and    |                |               |          |     |
| false alarm probability                    |             |        |               |                |         |        | 1              |               | 1        |     |
| Complete description of sys                |             |        |               |                |         |        |                |               |          |     |
| Enclosure specification clas               |             |        |               |                |         |        |                |               |          |     |
| Inclusion of any hazardous                 | materia     | al tha | t may requ    | ire addition   | al      |        |                |               |          |     |
| regulation<br>Description of data analysis | o office    | 250.01 | ad radianus   | lida idaatifi  | aatian  |        |                |               | -        |     |
| procedure                                  | SOILWE      | are ar | na radionuc   | ilide identili | cation  |        | H              |               | Ļ        |     |
| Description of operation and               | 1 nerfor    | mano   | re of the sy  | stem or un     | it      |        |                |               |          |     |
| boomption of operation and                 | Porior      | man    | 50 01 tho 0 y | otom or an     |         |        | H              |               | I        |     |
|  |             |        |               |                |         |        |                |               |          |     |
| Comments:                                  | ,           |        |               |                |         |        |                |               |          |     |
|  |             |        |               |                |         |        |                |               |          |     |
|  |             |        |               |                |         |        |                |               |          |     |
|  | <u></u>     |        |               |                |         |        |                |               |          |     |
|  |             |        |               |                |         |        | _              |               |          |     |
| Completed by:                              | <u> </u>    |        |               |                |         |        | Date:          |               | -        |     |
| Davidania d biri                           |             |        |               |                |         |        | Date           |               |          |     |
| Reviewed by:                               | <u> </u>    |        |               |                |         |        | Date:          |               |          |     |



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|        |   | S   | ection 5  | 5.2 - Tes                                   | t Prepai  | ration                                  |   |                                |          |
|--------|---|---|---|---|---|---|---|--------------------------------|----------|
|        |   |   | Test  | : Data an                                   | d Repo  | rt                                      |   |                                |          |
|        |   |   |   |   |   |   |   |                                |          |
| Manu   | ufacturer:  |   |   |   |   |   |   |                                |          |
|        | Model:  |   |   |   | Caria   | l Number:                               |   |                                |          |
|        | woder:  |   |   |   | Seria   | number:                                 |   |                                |          |
| Requir | rements:  |   |   |   |   |   |   |                                |          |
|        |   | ufacturer, Mo   | del and Se  | erial Numbe                                 | r   |   |   |                                |          |
|        |   | e manufacturer'   |   |   |   | number ar                               | nd firmware                             | number of                      | the      |
|        | instrumen   | t and detector,   | if separate.  |   |   |   |   |                                |          |
|        | Verify that and record 5.2.3 Type Identify and types use and record 5.2.4 Size Measure to 5.2.5 Wei | e<br>the dimensions   | r operating nis verificati  Detector - pe of instruite pe of alarm  (thickness, | on.  – NaI, GM, C ment (gamma n from manufa | EZT, etc., (M<br>a only or gai<br>acturer's doc | lodel & S/<br>mma/neutro<br>cumentation | <b>N)</b><br>on) and the<br>n (audible, | e radiation o<br>visible, vibi | detector |
|        | has the re  | the case to veri<br>ference point for<br>stograph<br>oh the instrumen | r the detec   | tor marked.                                 | Record the                                      | results of th                           | -                                       |                                | space an |
|        |   |   |   |   |   |   |   |                                |          |
| Note:  | Comment   | s are required v  | vhen the red  | quirement is                                | not verified.                                   | •                                       |   |                                |          |
|        |   |   |   |   |   |   |   |                                |          |
|        |   | Firmware:   |   |   |   |   |   |                                |          |
|        |   |   |   |   |   |   |   |                                |          |
|        |   |   |   |   |   |   |   |                                |          |
|        |   |   |   |   | Documenta                                       |   | 1. (1                                   |                                |          |
|        |   | Manufacturer hoperations of the                                       |   |   | for operating                                   | ig and ched                             | cking the                               | Yes                            | No       |
|        |   | operations of the   | ne matiuille  | 51 IC.                                      |   |   |   |                                |          |
|        |   |   |   |   |   |   |   |                                |          |
|        | Tvp   | e of Detector:  |   | Gamma                                       |   | Gamma/N                                 | leutron                                 |                                |          |
|        | 71  |   |   |   |   |   |   |                                |          |
|        | De  | etector descrip<br>Nal(TI), GM, I                                     |   |   |   |   |   |                                |          |
|        |   |   |   | Type of Ala                                 | rm (Chasse                                      | all tha a                               | nnly)                                   |                                |          |
|        |   |   | Audible   | iype oi Ala                                 | ini (Choose                                     | Visible                                 | ppiy)                                   |                                | Vibratio |
|        |   | 1   | , rudibie   |   |   | V ISIDIC                                |   | 1                              |          |
|        |   |   |   |   |   |   |   |                                | Vibratio |
|        |   | Size (cm):  |   | Width                                       |   | Length                                  |   | Thickness                      |          |
|        |   | Size (cm):  |   | Width                                       |   | Length                                  |   | Thickness                      |          |



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|               | Casa Camata | ustion (Chases all that are  | 1.4                 |
|---------------|-------------|------------------------------|---------------------|
|               | Case Const  | ruction (Choose all that app | iy)                 |
|               | Smooth      | No uncovered opening         | s to interior space |
|               | Rigid       | Reference point for de       | tector is marked    |
|               |             |                              |                     |
|               | Pr          | otograph of Instrument       |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
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|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
| Comments:     |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
|               |             |                              |                     |
| Performed by: |             |                              | Date:               |
|               |             |                              |                     |
| Reviewed by:  |             |                              | Date:               |



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|      |            | S             | ection        | 5.3 - Op                   | perating      | g Mode       | s            |              |            |
|------|------------|---------------|---------------|----------------------------|---------------|--------------|--------------|--------------|------------|
|      |            |               | Tes           | t Data a                   | and Re        | oort         |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
| Man  | ufacturer: |               |               |                            |               |              |              |              |            |
|      | Model:     |               |               | Seria                      | l Number:     |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
| Requ | iirements: | The instrur   | nent shall h  | nave at leas               | t two differe | ent operatin | ig modes as  | s follows:   |            |
|      |            |               |               |                            |               |              |              |              | _          |
|      |            |               | •             | erating mode               |               |              |              |              |            |
|      |            | radionuciid   | les, and ex   | posure rate                | measurem      | ent. Also n  | nay be calle | ed the "simp | ole mode." |
|      |            | Doctricted    | mada: an a    | advanced or                | oratina ma    | do that agr  | . ho ooooo   | ad by an a   | vnort upor |
|      |            |               |               | advanced or<br>control the | _             |              |              | -            | xpert user |
|      |            |               | -             | dionuclide I               | •             |              |              |              | rameters   |
|      |            |               | •             | ). Also may                | -             |              |              | -            | iameters,  |
|      |            | alaini tiilot | oriolas, etc. | ). 7 1130 may              | be called     | tric advanc  | oca or exp   | cit inode.   |            |
|      |            |               |               |                            |               |              |              |              |            |
|      | Note:      | Comments      | are require   | ed when the                | requireme     | nt is not ve | rified.      |              |            |
|      |            |               | •             |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              | Ve           | rify       |
|      |            |               |               |                            |               |              |              | Yes          | No         |
|      |            |               | Оре           | erating mod                | es describe   | ed in techni | cal manual   |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               | Operating                  | g modes di    | splayed by   | instrument   |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               | ls access t                | o the restri  | cted mode    | controlled?  |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      | List       | available     | modes of o    | operation:                 |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      | 4 -        |               |               |                            |               |              |              |              |            |
| C    | omments:   |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
| Com  | pleted by: |               |               |                            |               |              | Date:        |              |            |
| 20   |            |               |               |                            |               |              |              |              |            |
|      |            |               |               |                            |               |              |              |              |            |
| Rev  | iewed by:  |               |               |                            |               |              | Date:        |              |            |



Reviewed by:

| TEST AND EVALUATION PROTOCOL   | <b>TEP NO.</b> N42.34       | PREPAR<br>DIV682 | ED BY:               |
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|      |             |   | Sect   | ion 5.4  | - Mark   | ings   |  |   |                       |
|------|-------------|---|--|--|--|--|--|---|-----------------------|
|      |             |   | Tes  | t Data   | and Re   | port   |  |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
| Man  | ufacturer:  |   |  |  |  |  |  |   |                       |
|      | Model:      |   |  | Seria  | I Number:  |  |  |   |                       |
| Regu | irements:   | All externa   | l instrumen  | t controls   | displays a   | nd adjustm   | ents shall b   | e identified  | as to                 |
| Negu |             | function. Ir<br>identification<br>permanent<br>decontami<br>The following<br>subassem<br>5.4.1.1 Ma<br>5.4.1.2 Un<br>5.4.1.3 Loo<br>5.4.1.4 Funder software | nternal contion in technically fixed undination processing markings bly (i.e., definition of the nction designation of the nction designation of the contion designation of the continuous designation desig | rols needed<br>cal manual<br>ler normal dedures).<br>s shall apportector prob-<br>and model<br>number,<br>e effective of<br>gnation for de | d for operations. External conditions of the ear on the | on shall be markings sof use (incluse terior of the priate:  area(s) of control of the priate: | e identified the shall be eas uding use of the instrume detection (red adjustment) | nrough mari<br>ily readable<br>normal<br>nt or each | kings and e and major |
|      | note.       | Comments  | are require  | u when the   | requireme  | III IS HOL VE  | illieu.  |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
|      |             |   |  |  |  |  |  | Ve  | rify                  |
|      |             |   |  |  |  |  |  | Yes   | No                    |
|      |             |   |  |  | Manufactu  | rer and mo   | del number   |   |                       |
|      |             |   |  |  |  | Unique   | rial number  |   |                       |
|      |             |   |  |  |  | Offique Se   | rial number  |   |                       |
|      |             |   | Location of  | the effective  | e center(s)  | or area(s)   | of detection   |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
| Func | tion desigr | ation for co  | ontrols, swit  | ches, and  | adjustment   | _  | not menu or<br>ware driven   |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
| ~    | .mm.====    |   |  |  |  |  |  |   |                       |
| C    | omments:    |   |  |  |  |  |  |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
|      |             |   |  |  |  |  |  |   |                       |
| Comp | oleted by:  |   |  |  |  |  | Date:  |   |                       |

Date:



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|                            |   | Sections  | 5.5 - Com  | munication   | Interface   | <u> </u>  |  |  |    |
|----------------------------|---|---|--|--|---|---|--|--|----|
|                            |   |   |  | and Report   |   |   |  |  |    |
|                            |   |   |  | •  |   |   |  |  |    |
| Manufacturer               |   |   |  |  |   |   |  |  |    |
| Model:                     |   |   |  | Serial Number:   |   |   |  |  |    |
| Requirements:              | should be ba<br>electronic musing wireles<br>Communicat<br>used.<br>Proprietary s<br>the XML form | ased on a bi-dir<br>eans such as a<br>as data transfer<br>tion protocols s<br>software should<br>nat. The manuf | ectional port that<br>a removable me<br>r techniques. The<br>shall be described<br>I not be required | Inster data to an exact meets the required dia device. Considue technique used of in the technical for remote data is exide proprietary shall be used. | irements of Eth<br>deration should<br>d shall conform<br>all manual and p | nernet, USE I be given to to applicate proprietary f The transfel | B, wireless o data sec ole IEEE p formats sh | s, or other<br>curity when<br>protocols.<br>all not be |    |
|                            |   |   |  |  |   |   |  |  |    |
| Note:                      | Comments a  | are required who  | en the requirem  | ent is not verified.   |   | •   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
| Ambient                    | Conditions:   |   | °C   |  | %RH   |   | in HG  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
| Test Equip                 | ment Used:  |   |  |  |   |   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
| So                         | ource Data:   |   |  |  |   |   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
| Describe the data transfer | r technique   |   |  |  |   |   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            |   |   |  |  |   |   |  | Verify   |    |
|                            |   |   |  |  |   |   | Yes  | No   | NA |
|                            | Doest   | he monitor ha   | ve the ability   | to transfer data   | to an externa   | I device?   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            |   |   |  | Is the transr  | nission bi-dire   | ectional?   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
| Is the transfer bas        | sed on comm   | nonly availabl  | le technology?   | e.g. Ethernet,   | wireless, USE   | 3, RS-232)  |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            | lf t  | he transfer is  | wireless, does   | it have the abil   | ity to encrypt  | the data?   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            |   | Is the  | transfer protoc  | ol described in  | the technical   | manual?   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            |   | Is  | the data form  | at described in  | the technical   | manual?   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            |   |   |  | ls t   | he data forma   | t in XML?   |  |  |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            |   | Does the  | data format co   | omply with ANS   | N42.42 requi  | rements?  |  | $\bot$   |    |
|                            |   |   |  |  |   |   |  |  |    |
|                            | Did the n   | nanufacturer  | provide propri   | etary software f   | or data interp  | retation?   | <u> </u>                                     |  |    |
|                            |   |   |  |  |   |   |  |  |    |



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| Comments:     |      |      |       |  |  |
|---------------|------|------|-------|--|--|
| Comments.     |      |      |       |  |  |
|               |      |      |       |  |  |
|               |      |      |       |  |  |
|               |      |      |       |  |  |
|               |      |      |       |  |  |
| Completed by: | <br> | <br> | Date: |  |  |
| Reviewed by:  |      |      | Date: |  |  |
| Reviewed by:  |      |      | Date. |  |  |
|               |      |      |       |  |  |
|               |      |      |       |  |  |



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|            |                               | Tes           | t Data        | and Re        | port        |               |              |       |
|------------|-------------------------------|---------------|---------------|---------------|-------------|---------------|--------------|-------|
|            |                               |               |               |               |             |               |              |       |
| anufacture | :                             |               |               |               |             |               |              |       |
| Mode       | :                             |               | Seria         | l Number:     |             |               |              |       |
|            |                               |               |               |               |             |               |              |       |
| quirements | _                             | mont oball i  | noludo:       |               |             |               |              |       |
|            | THE IIISHU                    | ment shall i  | riciuue.      |               |             |               |              |       |
|            | • A display                   | v that is eas | silv readabl  | e over the r  | equired te  | mperature ra  | ange and ur  | nder  |
|            |                               | hting condi   | -             |               | - 4         |               |              |       |
|            | Ì                             |               |               |               |             |               |              |       |
|            | <ul> <li>Controls</li> </ul>  | that are us   | er-friendly f | or routine o  | peration    |               |              |       |
|            |                               |               |               |               |             |               |              |       |
|            | • Controls                    | and switch    | es that are   | designed in   | n a way to  | minimize a    | ccidental of | perat |
|            | • A menu                      | etructure th  | at is simple  | and easy      | to be follo | wed intuitive | dv           |       |
|            | - A IIIciiu                   | Structure tri | iat is simpli | e and easy    | to be lollo | wea milailive | ч            |       |
|            | At least                      | two differen  | t operating   | modes (see    | e 5.3)      |               |              |       |
|            |                               |               | 3             | (             | ,           |               |              |       |
|            | • The capa                    | ability to op | erate if the  | user is wea   | ring glove  | S             |              |       |
|            |                               |               |               |               |             |               |              |       |
|            | • A user-d                    | efinable rad  | ionuclide li  | brary with a  | ccess via   | the restricte | ed mode      |       |
|            | lf more u                     | care parfor   | m this tos    | than addi     | tional tak  | oles should   | ho addad     |       |
|            | II IIIOI e u                  | sers perior   | III UIIS IES  | i illeli audi | lionai lai  | nes snouiu    | be added     | •     |
|            |                               |               |               |               |             |               |              | Т     |
| Note       | : Comment                     | s are require | ed when the   | e requireme   | nt is not v | erified.      |              |       |
|            |                               |               |               |               |             |               |              |       |
|            |                               |               |               |               |             |               |              |       |
|            |                               |               |               |               |             |               | 1            |       |
|            |                               |               |               |               |             |               | Yes          |       |
|            | play readabl                  |               | equirea ten   | nperature ra  | inge and ι  | ınder         |              |       |
|            | ighting cond<br>are user-frie |               | ine oneratio  | one?          |             |               |              | -     |
|            | are switches                  |               |               |               | ntal opera  | tion?         |              | +     |
|            | structure is                  |               |               |               | spora       |               |              | T     |
|            | at least two                  |               |               |               |             |               |              |       |
| There are  |                               |               |               |               |             |               | +            | 1     |
| Can the ι  | iser operate<br>iser define t | the instrum   | nent with gl  | oves?         |             |               |              |       |



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| SER 1 |             |                   |                |            |              |             |            |      |    |
|-------|-------------|-------------------|----------------|------------|--------------|-------------|------------|------|----|
|       |             |                   |                |            |              |             |            |      |    |
|       |             |                   | \A/:4b.o.      | ıt Clayes  | in a law la  | val limbi   | 4450 Luy   |      |    |
|       |             |                   | witho          | at Gloves  | in a low le  | ever light  | <150 lux   | 1 1/ |    |
|       | 1- 24       | Shilla da deserra | 41 ! 4         |            |              |             |            | Yes  | No |
|       |             | ible to turn      |                |            |              |             |            |      |    |
|       |             | ible to calib     |                |            | a a uram ant | <u> </u>    |            |      |    |
|       |             | ible to make      |                |            |              | ?           |            |      |    |
|       |             | ible to make      |                | ation meas | surement?    |             |            |      |    |
|       | <del></del> |                   |                | 4          |              | £-11        | I          |      |    |
|       |             | ible to trans     |                |            | rnai device  | tollowing t | ne         |      |    |
|       |             | urer provide      |                |            | ·om +2       |             |            |      |    |
|       |             | ible to acce      |                |            | ary ?        |             |            |      |    |
|       | is it poss  | ible to turn      | off the instru | ment?      |              |             |            |      |    |
|       |             |                   |                |            |              |             |            |      |    |
|       |             |                   | 141111         |            | <u> </u>     |             | 10.0001    |      |    |
|       |             |                   | Without        | Gloves in  | a nigh lev   | el light >  | 10 000 lux | 1    |    |
|       |             | 71. 6. 6          |                |            |              |             |            | Yes  | No |
|       |             | ible to turn      |                |            |              |             |            |      |    |
|       |             | ible to calib     |                |            | 10           | `           |            |      |    |
|       |             | ible to make      |                |            |              | <u> </u>    |            |      |    |
|       | <u> </u>    | ible to make      |                | ation meas | surement?    |             |            |      |    |
|       | is it poss  | ible to save      | the data?      | 1          | 1            |             |            |      |    |
|       |             |                   |                |            |              |             |            |      |    |
|       |             |                   | 10000          |            |              |             |            |      |    |
|       |             |                   | With G         | ioves in a | high leve    | I light >1  | 0 000 Tux  | 1    |    |
|       |             | 71. 6 6           |                | 10         |              |             |            | Yes  | No |
|       |             | ible to turn      |                |            |              |             |            |      |    |
|       |             | ible to calib     |                |            |              |             |            |      |    |
|       |             | ible to make      |                |            |              | <u> </u>    |            |      |    |
|       |             | ible to make      |                | ation meas | surement?    |             |            |      |    |
|       | is it poss  | ible to save      | tne data?      |            |              | 1           |            |      |    |
|       |             |                   |                |            |              |             |            |      |    |



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| R 2 |  |       |     |
|-----|--|-------|-----|
|     |  |       |     |
|     | With and Olevers in a law level limbs 450 has  |       |     |
|     | Without Gloves in a low level light <150 lux   | 1     |     |
|     | la it nacaible to turn on the instrument?  | Yes   | No  |
|     | Is it possible to turn on the instrument? Is it possible to calibrate the instrument?                    |       |     |
|     | Is it possible to calibrate the instrument? Is it possible to make an exposure rate measurement?         |       |     |
|     | Is it possible to make an exposure rate measurement?   |       |     |
|     | Is it possible to make an identification measurement?  |       |     |
|     | Is it possible to save the data? Is it possible to transfer the data to an external device following the |       |     |
|     | manufacturer provided information?   |       |     |
|     | Is it possible to access the radionuclide library?   |       |     |
|     |  |       |     |
|     | Is it possible to turn off the instrument?   |       |     |
|     |  |       |     |
|     | Without Olaves in a high level light, 40 000 by  |       |     |
|     | Without Gloves in a high level light >10 000 lu  |       | NI. |
|     | Is it possible to turn on the instrument?  | Yes   | No  |
|     | Is it possible to calibrate the instrument?  |       |     |
|     | Is it possible to calibrate the instrument? Is it possible to make an exposure rate measurement?         |       |     |
|     | Is it possible to make an exposure rate measurement?   | -     |     |
|     | Is it possible to save the data?   |       |     |
|     | is it possible to save the data?   |       |     |
|     |  |       |     |
|     | With Gloves in a high level light >10 000 lux  |       |     |
|     | With Gloves in a high level right >10 000 lux  | l Vaa | No  |
|     | Is it possible to turn on the instrument?  | Yes   | INC |
|     | Is it possible to calibrate the instrument?  | +     |     |
|     | Is it possible to calibrate the instrument?  | -     |     |
|     |  |       |     |
|     | Is it possible to make an identification measurement?  |       |     |
|     | Is it possible to make an identification measurement? Is it possible to save the data?                   |       |     |



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|             |   | Witho  | ut Gloves  | in a low lo  | val light   | 4150 luv   |   |  |
|-------------|---|--|--|--|---|--|---|--|
|             |   | VVILLIO  | ut GIOVES  | iii a iUW le   | ver ngnt <  | IJU IUX  | Vos   | No   |
| e it noeeih | ole to turn o   | n the instr  | ıment?   |  |   |  | 162   | NO   |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  | asurement?   | 1   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
| •           |   |  | to an exte   | rnal device  | following th  | ne   |   |  |
| •           |   |  |  | mar dovido   | ionownig a  |  |   |  |
|             |   |  |  | rary?  |   |  |   |  |
|             |   |  |  | - ,  |   |  |   |  |
| - 1         |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   | Without  | Gloves in  | a high lev   | el liaht >1   | 0 000 lux  |   |  |
|             |   |  |  | <u> </u>   |   |  | Yes   | No   |
| s it possib | ole to turn o   | n the instru   | ument?   |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
| s it possik | ole to make   | an exposu  | re rate mea  |  | ı   |  |   |  |
| s it possib | ole to make   | an identific   | cation meas  | surement?  |   |  |   |  |
| s it possib | ole to save t   | he data?   |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   | With G   | loves in a   | high leve  | light >10   | 000 lux  |   |  |
|             |   |  |  |  |   |  | Yes   | No   |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
| •           |   |  | cation meas  | surement?  |   |  |   |  |
| s it possib | ole to save t   | he data?   |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
| mments:     |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
|             |   |  |  |  |   |  |   |  |
| loted by    |   |  |  |  |   | Data   |   |  |
| leted by:   |   |  |  | 1  |   | Date:  |   |  |
| leted by:   |   |  |  |  |   | Date:  |   |  |
|             | s it possit manufactu s it possit | s it possible to calibrate it possible to make so it possible to make so it possible to save to so it possible to transformanufacturer provided so it possible to access it possible to turn of so it possible to calibrate it possible to make so it possible to make so it possible to save to so it possible to turn of so it possible to save to so it possible to make so it possible to turn of so it possible to make so it possible to save to save to so it possible to save to save to so it possible to save to | s it possible to turn on the instrusion it possible to make an exposus it possible to make an identification in the instruction in the instruction is it possible to transfer the data manufacturer provided informations it possible to access the radions it possible to turn off the instruction in the instruction is it possible to turn on the instruction in the instruction in the instruction is it possible to make an exposus it possible to make an identification in the instruction in the | s it possible to turn on the instrument? s it possible to calibrate the instrument? s it possible to make an exposure rate me s it possible to make an identification mea s it possible to save the data? s it possible to transfer the data to an exte manufacturer provided information? s it possible to access the radionuclide libs s it possible to turn off the instrument? s it possible to calibrate the instrument? s it possible to make an exposure rate me s it possible to make an identification mea s it possible to save the data?  With Gloves in a  With Gloves in a  s it possible to turn on the instrument? s it possible to calibrate the instrument? s it possible to make an exposure rate me s it possible to make an exposure rate me s it possible to make an exposure rate me s it possible to make an identification mea s it possible to save the data? | s it possible to turn on the instrument? s it possible to calibrate the instrument? s it possible to make an exposure rate measurement? s it possible to make an identification measurement? s it possible to save the data? s it possible to transfer the data to an external device manufacturer provided information? s it possible to access the radionuclide library? s it possible to turn off the instrument? s it possible to calibrate the instrument? s it possible to make an exposure rate measurement? s it possible to make an identification measurement? s it possible to save the data?  With Gloves in a high level  With Gloves in a high level s it possible to calibrate the instrument? s it possible to turn on the instrument? s it possible to make an exposure rate measurement? s it possible to make an exposure rate measurement? s it possible to make an exposure rate measurement? s it possible to make an identification measurement? s it possible to save the data? | s it possible to turn on the instrument? s it possible to calibrate the instrument? s it possible to make an exposure rate measurement? s it possible to make an identification measurement? s it possible to save the data? s it possible to transfer the data to an external device following the manufacturer provided information? s it possible to access the radionuclide library? s it possible to turn off the instrument?  Without Gloves in a high level light >1  s it possible to calibrate the instrument? s it possible to make an exposure rate measurement? s it possible to make an identification measurement? s it possible to save the data?  With Gloves in a high level light >10  s it possible to calibrate the instrument? s it possible to make an exposure rate measurement? s it possible to make an exposure rate measurement? s it possible to make an exposure rate measurement? s it possible to make an identification measurement? s it possible to make an identification measurement? s it possible to make an identification measurement? s it possible to save the data? | s it possible to calibrate the instrument? s it possible to make an exposure rate measurement? s it possible to make an identification measurement? s it possible to save the data? s it possible to transfer the data to an external device following the manufacturer provided information? s it possible to access the radionuclide library? s it possible to turn off the instrument?  Without Gloves in a high level light >10 000 lux  s it possible to turn on the instrument? s it possible to calibrate the instrument? s it possible to make an identification measurement? s it possible to save the data?  With Gloves in a high level light >10 000 lux  s it possible to turn on the instrument? s it possible to calibrate the instrument? s it possible to turn on the instrument? s it possible to make an exposure rate measurement? s it possible to make an identification measurement? s it possible to make an identification measurement? s it possible to save the data? | s it possible to turn on the instrument?  si t possible to calibrate the instrument? si t possible to make an exposure rate measurement? si t possible to make an identification measurement? si t possible to save the data? si t possible to transfer the data to an external device following the manufacturer provided information? si t possible to access the radionuclide library? si t possible to turn off the instrument?  Without Gloves in a high level light >10 000 lux  Yes si t possible to calibrate the instrument? si t possible to make an exposure rate measurement? si t possible to make an identification measurement? si t possible to save the data?  With Gloves in a high level light >10 000 lux  Yes si t possible to save the data?  Si t possible to turn on the instrument? si t possible to calibrate the instrument? si t possible to make an exposure rate measurement? si t possible to make an exposure rate measurement? si t possible to make an exposure rate measurement? si t possible to make an exposure rate measurement? si t possible to make an exposure rate measurement? si t possible to make an exposure rate measurement? si t possible to make an identification measurement? si t possible to save the data? |



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|                  | Section 5.7 - Warm Up Time  Test Data and Report  Manufacturer:  Model:  Serial Number:  Requirements: The manufacturer shall state the time required for the instrument to become f functional from either a dead start or when in a standby mode. The maximum be less than 2 minutes.  Note: Comments are required when the requirement is not verified.  Ambient Conditions:  C %RH in HG  Source data:  Test Equipment Used:  The manufacturer stated the time for the instrument to be fully operational from dead start?  The manufacturer stated the time for the instrument to be fully operational from standby mode?  Is the warm-up time less or equal to 2 min?  Is the instrument able to perform an exposure rate measurement after the warm-up time? |               |             |             |                |              |             |       |         |
|------------------|---|---------------|-------------|-------------|----------------|--------------|-------------|-------|---------|
|                  |   |               | Test D      | ata and     | d Repor        | 't           |             |       |         |
|                  |   |               |             |             |                |              |             |       |         |
| Man              |   |               |             |             |                |              |             |       |         |
|                  | Model:  |               |             | Seria       | I Number:      |              |             |       |         |
| Requ             | irements:   | functional f  | from either | a dead star |                |              |             |       |         |
|                  | Note:   | Comments      | are require | ed when the | e requireme    | nt is not ve | rified.     |       |         |
|                  |   |               |             |             |                |              | 1           |       |         |
|                  | Ambient C   | onditions:    |             | °C          |                | %RH          |             | in HG |         |
|                  | Soi   | urce data:    |             |             |                |              |             |       |         |
| Te               | st Fauinm   | ent Used:     |             |             |                |              |             |       |         |
|                  | or Equipin  | ont occur     |             |             |                |              | l.          |       |         |
|                  |   |               |             |             |                |              |             |       | erify   |
| The manufactu    | ırer stated   | the time for  | the instru  | ment to be  | fully operati  | onal from o  | lead start? | Yes   | No      |
|                  | 2.0.0.000   |               |             |             | iany operati   |              |             |       |         |
| The manufacturer | stated the  | time for the  | instrument  | to be fully | operational    | from stand   | dby mode?   |       |         |
|                  |   |               | ı           | s the warm  | -un time les   | ss or equal  | to 2 min?   |       | T       |
|                  |   |               |             |             |                |              |             |       |         |
| Is the instrum   | nent able to  | perform ar    | exposure    | rate measu  | urement afte   | er the warm  | -up time?   |       |         |
| Is the           | e instrumer   | nt able to pe | erform a ne | utron meas  | urement aft    | er the warn  | n-up time?  |       |         |
|                  |   |               |             |             |                |              | ·           |       |         |
| Is the in        | strument a  | ble to perfo  | rm a radion | uclide iden | tification aft | er the warn  | n-up time?  |       |         |
|                  |   |               |             |             |                |              |             |       |         |
|                  |   |               |             | Stated      | Warm Up        | Time From    | Dead Start  |       | seconds |
|                  |   |               |             | Stated Wa   | arm Up Time    | e From Sta   | ndby Mode   |       | seconds |
|                  |   |               |             |             |                |              |             |       |         |
| C                | omments:  |               |             |             |                |              |             |       |         |
|                  | omments.  |               |             |             |                |              |             |       |         |
|                  |   |               |             |             |                |              |             |       |         |
|                  |   |               |             |             |                |              |             |       |         |
|                  |   |               |             |             |                |              |             |       |         |
|                  |   |               |             |             |                |              |             |       |         |
| Com              | oleted by:  |               |             |             |                |              | Date:       |       |         |
|                  |   |               |             |             |                |              | <b>B</b> (  |       |         |
| Revi             | iewed by:   |               |             |             |                |              | Date:       |       |         |



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|               |  | Test  | Data an  | d Repo   | rt  |   |  |                                      |
|---------------|--|---|--|--|---|---|--|--------------------------------------|
|               |  |   |  |  |   |   |  |                                      |
| Manufacturer: |  |   |  |  |   |   |  |                                      |
| Model:        |  |   | Seria  | l Number:  |   |   |  |                                      |
| Requirements: | a) Instrum<br>condition<br>b) The ma<br>recomme<br>determine<br>c) The ins | ods listed in the standard of the same of |  | with a test ne expecte conditions (                              | circuit or of discontinuor of | other visible us operating and environ  | direct indicates time using mental) used | ator of b<br>the<br>d to<br>ours aft |
|               | the minim<br>d) If opera<br>be unique<br>tools. Bat                        | num voltage<br>ated using o<br>to the inst<br>tery charge   | e required for<br>consumable<br>rument, and<br>ers shall mee | proper ope<br>batteries, the<br>shall be field<br>but U.S. elect | ration.<br>ne batteries<br>Id replacea<br>strical stand   | s shall be w<br>able (e.g., A<br>dards. | idely availat<br>A, 9 V) with            | ole, shal<br>no spe                  |
|               | protection   |   | ould be capa<br>se polarity, o<br>de:                        | -  | _   |   |  | -                                    |
|               | 2) A porta   | ble battery   | as would be<br>pack, such<br>OC power sup                    | as one tha   | t can be w  | orn, that sup                           | •  |                                      |
|               |  |   |  |  |   |   |  |                                      |



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| Ambient Conditions:   | °C  | %RH   |     | in HG |
|---|---|---|-----|-------|
| Source data:  |   |   |     |       |
|   |   |   |     |       |
| Test Equipment Used:  |   |   |     |       |
|   |   |   | Yes | No    |
| The instrument is equipped with                                       | a test circuit or a   | visible indication of   |     |       |
| battery condition?  |   |   |     |       |
| The manufacturer states the exp                                       | pected continuous   | operating time?   |     |       |
|   |   |   |     |       |
| The manufacturer states the co  |   |   |     |       |
| used to determine the expected  | continuous operat   | ing time?   |     |       |
| The instrument was fully operat                                       |   |   |     |       |
| to answer this question use test                                      | data summarized   | in table below?   |     |       |
| The low-battery indication is not                                     | t lower than the m  | nimum voltage   |     |       |
| required for proper operation?  |   |   |     |       |
| If it was a consumable betteries                                      | the betteries are   | videly eveileble?   |     | T     |
| If it uses consumable batteries,                                      | the batteries are   | widely available?   |     |       |
| If it uses consumable batteries,                                      | the batteries are   | not unique to the   |     |       |
| instrument?   |   |   |     |       |
| If it uses consumable batteries,                                      | the batteries can   | be field replaced with  |     | T     |
| no special tools?   |   | ·   |     |       |
| Is the instrument capable of ope                                      | erating from an ext   | emal DC power   |     |       |
| source?   | orating from an ext   | emai Bo power   |     |       |
| If yes, to this last question, the                                    |   |   | Yes | No    |
| Does it have ade  | equate protection for   | rom reversed polarity?  |     |       |
|   |   |   |     | T     |
| Does it have  | e adequate protect  | ion from over-voltage?  |     |       |
|   |   |   |     |       |
|   |   | ion from over-voltage? from electrical noise?   |     |       |
|   | lequate protection  | from electrical noise?  |     |       |
| Does it have ad   | lequate protection  | from electrical noise?  |     |       |
| Does it have ad   | lequate protection<br>lude a nominal 12<br>from a vehice                                  | from electrical noise?  VDC as that obtained cle electrical system?   |     |       |
| Does it have ad   | lequate protection lude a nominal 12 from a vehicurce include a port                      | from electrical noise?  VDC as that obtained cle electrical system?   |     |       |
| Does it have ad  Does the DC power source incl  Does the DC power sou | lequate protection<br>lude a nominal 12<br>from a vehic<br>urce include a port<br>supplie | from electrical noise?  VDC as that obtained cle electrical system?  able battery pack that es 9 VDC to 14 VDC? |     |       |
| Does it have ad   | lequate protection lude a nominal 12 from a vehicurce include a port- supplie             | from electrical noise?  VDC as that obtained cle electrical system?  able battery pack that es 9 VDC to 14 VDC? |     |       |



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|   |       | To verify | item c) in th                            | e list of req | uirements           |       |  |
|---|-------|-----------|--|---------------|---------------------|-------|--|
|   | 3 - 3 |           | 2 hours of Low-batter al operation activ |               | /indication<br>ated |       |  |
|   | Yes   | No        | Yes                                      | No            | Yes                 | No    |  |
| Was the instrument able to perform an Exposure Rate reading?      |       |           |  |               |                     |       |  |
| Did the instrument respond to<br>Neutrons?                        |       |           |  |               |                     |       |  |
| Was the instrument able to perform a Radionuclide Identification? |       |           |  |               |                     |       |  |
| Comments:   |       |           |  |               |                     |       |  |
| Completed by:   |       |           |  |               |                     | Date: |  |
| Reviewed by:  |       |           |  |               |                     | Date: |  |



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| S             | Section       | 5.9 Effe    | ective F     | Range o       | f Meas        | uremer        | nt        |           |
|---------------|---------------|-------------|--------------|---------------|---------------|---------------|-----------|-----------|
|               |               |             |              | and Re        |               |               |           |           |
|               |               | 103         | Data         | aria ite      | JO1 t         |               |           |           |
| Manufacturer: |               |             |              |               |               |               |           |           |
| Model:        |               |             | Seria        | l Number:     |               |               |           |           |
|               |               |             | <b>30114</b> |               |               |               |           |           |
| Requirements: | The effective | ve gamma e  | energy resp  | onse range    | shall be st   | ated by the   | manufactu | ırer, and |
|               |               | -           |              | -             |               | all also stat |           |           |
|               |               |             |              |               |               | unt rate ind  | •         |           |
|               |               | •           |              |               |               |               |           |           |
|               | Verify by re  | eview manu  | facturer pro | ovided inform | nation.       |               |           |           |
|               |               |             |              |               |               |               |           |           |
| Note:         | Comments      | are require | ed when the  | requireme     | nt is not ver | rified.       |           |           |
|               |               |             |              |               |               |               |           |           |
|               |               |             |              |               |               |               |           |           |
|               | <u></u>       | Ve          | rify         | <u>-</u>      |               | Yes           | No        |           |
| _             |               |             |              |               |               |               |           |           |
|               | y response i  | -           | the gamma    | a and neutro  | on count      |               |           |           |
| rate range    | are indicate  | ed.         |              |               |               |               |           |           |
|               |               |             |              |               |               |               |           | <u> </u>  |
| _             |               |             |              |               |               |               |           |           |
|               | nergy respo   |             |              |               |               |               |           |           |
|               | a exposure    |             |              |               |               |               |           |           |
| Net           | utron count   | rate range: |              |               |               |               |           |           |
| 0             |               |             |              |               |               |               |           |           |
| Comments:     |               |             |              |               |               |               |           |           |
| Comments.     |               |             |              |               |               |               |           |           |
| Comments.     |               |             |              |               |               |               |           |           |
| Comments.     |               |             |              |               |               |               |           |           |
| Comments.     |               |             |              |               |               |               |           |           |
| Comments.     |               |             |              |               |               |               |           |           |
| Comments.     |               |             |              |               |               |               |           |           |
| Comments.     |               |             |              |               |               |               |           |           |
| Comments.     |               |             |              |               |               |               |           |           |
|               |               |             |              |               |               |               |           |           |
|               |               |             |              |               |               |               |           |           |
| Completed by: |               |             |              |               |               | Date:         |           |           |
| Completed by: |               |             |              |               |               |               |           |           |
|               |               |             |              |               |               | Date:         |           |           |



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|               |  | Test Data a                   | and Re        | port         |               |           |           | I       |    |  |
|---------------|--|-------------------------------|---------------|--------------|---------------|-----------|-----------|---------|----|--|
| Manufacturer: |  | Soria                         | I Number:     |              |               |           |           |         |    |  |
| Woder.        |  | Ocha                          | i italiibei.  |              |               |           |           |         |    |  |
| Requirements: | The following requ<br>test methods liste   |                               | e verified th | rough the    | performar     | nce of th | ie same   | ordered |    |  |
|               | a) A display of the  | gamma-ray spec                | ctrum shall   | be availab   | le for revie  | W.        |           |         |    |  |
|               | The instrument sh<br>spectra. Each spe<br>including:   |                               |               |              |               |           |           |         | d) |  |
|               | <ul> <li>Time and date</li> <li>Identified radion</li> <li>Spectrum integr</li> <li>Measured gamr</li> <li>Neutron count ra</li> </ul> | ation time<br>na-ray exposure | rate          |              | onfidence i   | ndicatio  | ons       |         |    |  |
|               | NOTE—The data  |                               |               |              | 42.           |           |           |         |    |  |
|               | b) An indication st<br>radionuclide cann   |                               | or otherwis   | e provideo   | I (i.e., "not | identifie | ed") if a |         |    |  |
|               | c) The manufactu   | er shall describe             | the meani     | ng of relial | oility or cor | nfidence  | e indicat | ions.   |    |  |
|               |  |                               |               |              |               |           |           |         |    |  |



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|                           |            |              | Requi          | rement        |              |                |            | Yes |   |
|---------------------------|------------|--------------|----------------|---------------|--------------|----------------|------------|-----|---|
| The instrun               | nent can   | display a d  | gamma-ray si   |               | review?      |                |            |     |   |
|                           |            |              | , ,            |               |              |                |            |     |   |
| The instrur               | nent has   | the ability  | to store at le | ast 50 com    | olete (unpro | ocessed dat    | a)?        |     |   |
|                           |            |              |                |               | (4           |                | ,          |     |   |
| The instrum               | nent has   | the ability  | to transfer at | least 50 cc   | mnlete (un   | nrocessed      | tata)?     |     |   |
| THE INSTITUTE             | iciit iias | tric ability | to transier at | icast 50 cc   | inpicte (un  | processeu      | iala):     |     |   |
| Each spec                 | trum conf  | taine:       |                |               |              |                | 1          |     |   |
| Lacii spec                | train con  | tanio.       |                |               | Time         | and date in    | formation? |     |   |
| _                         |            |              |                |               |              | entified radio |            |     |   |
|                           |            |              |                |               |              | dionuclide (   |            |     |   |
|                           |            |              |                | As            |              | onfidence in   |            |     |   |
|                           |            |              |                | 7.0           |              | trum integra   |            |     |   |
|                           |            |              |                | Meas          |              | na-ray expo    |            |     |   |
|                           |            |              |                |               |              |                | ount rate? |     |   |
|                           |            |              |                |               |              |                |            |     |   |
| The instrur               | nent provi | ides an ind  | ication when   | a radionucl   | ide cannot   | be identifie   | 17         |     |   |
|                           |            |              |                |               |              |                |            |     |   |
| The manuf:                | acturer de | escribed th  | e meaning of   | reliability o | r confidenc  | e indication   | s?         |     | _ |
|                           | actuici ac | oonboa ui    | o moailing of  | Toniability 0 |              |                |            |     |   |
|                           |            |              |                |               |              | o intaloation  | J:         |     |   |
|                           | aent indic | ates if the  | evnosure rat   | e is too hig  | n or too lov |                |            |     |   |
| The instrun               |            | ates if the  | exposure rat   | e is too hig  | h or too lov |                |            |     |   |
|                           |            | ates if the  | exposure rat   | e is too hig  | n or too lov |                |            |     |   |
| The instrun               |            | ates if the  | exposure rat   | e is too hig  | n or too low |                |            |     |   |
| The instrun               |            | cates if the | exposure rat   | e is too hig  | n or too low |                |            |     |   |
| The instrunidentification |            | cates if the | exposure rat   | e is too hig  | n or too low |                |            |     |   |
| The instrun               |            | eates if the | exposure rat   | e is too hig  | n or too low |                |            |     |   |
| The instrunidentification |            | cates if the | exposure rat   | e is too hig  | n or too low |                |            |     |   |
| The instrunidentification |            | cates if the | exposure rat   | e is too hig  | n or too low |                |            |     |   |
| The instrunidentification |            | cates if the | exposure rat   | e is too hig  | n or too low |                |            |     |   |
| The instrunidentification |            | cates if the | exposure rat   | e is too hig  | n or too low |                |            |     |   |
| The instrunidentification |            | cates if the | exposure rat   | e is too hig  | n or too lov | v for radionu  |            |     |   |
| The instrunidentification |            | cates if the | exposure rat   | e is too hig  | n or too lov |                |            |     |   |
| The instrunidentification |            | cates if the | exposure rat   | e is too hig  | n or too lov | v for radionu  |            |     |   |



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|               | Section      | 5.11 P         | ersonn        | el Prote       | ection                                | Alarm                         |           |          |
|---------------|--------------|----------------|---------------|----------------|---------------------------------------|-------------------------------|-----------|----------|
|               |              | Test           | Data a        | nd Rep         | ort                                   |                               |           |          |
| Manufacturer: |              |                |               |                |                                       |                               |           |          |
| Model:        |              |                | Seria         | l Number:      |                                       |                               |           |          |
| Woder.        |              |                | Octio         | i italiibei.   |                                       |                               |           |          |
|               |              |                |               |                |                                       |                               |           |          |
| Requirements: |              |                |               |                |                                       |                               |           |          |
|               |              |                |               |                |                                       | udible and vi                 |           | -        |
|               |              |                |               |                |                                       | cknowledge"<br>switch off all |           |          |
|               | same time.   |                | unction. It's | naii not be p  | ossible id                            | Switch on an                  | alarm mul | cators a |
|               | Same ume.    | •              |               |                |                                       |                               |           |          |
|               |              |                |               |                |                                       |                               |           |          |
| Noto          | Comments     | aro roquir     | nd whon the   | roquiromo      | nt ic not v                           | prified                       |           |          |
| Note.         | Comments     | are require    | su when the   | requirerne     | 111 13 1101 1                         | Merilleu.                     |           |          |
|               |              |                |               |                |                                       |                               |           |          |
| Ambient C     | onditions:   |                | °C            |                | %RH                                   |                               | in HG     |          |
|               |              |                |               |                |                                       |                               |           |          |
| Test Equipm   | nent Used:   |                |               |                |                                       |                               |           |          |
|               |              |                |               |                |                                       |                               |           |          |
|               |              |                | 7             | Test Result    | s                                     |                               |           |          |
|               |              |                |               |                |                                       |                               | Yes       | N        |
|               | s provided t |                |               | the measur     | ed exposi                             | ure rate is                   |           |          |
|               | er-selected  |                |               |                |                                       |                               |           |          |
| The alarm     | is both aud  | ible and vis   | ual, and is   | adjustable     | through th                            | ne restricted                 |           |          |
| mode.         |              |                |               |                |                                       |                               |           |          |
|               | has an "acl  | knowledge"     | or other si   | milar contro   | ol to silend                          | ce the                        |           |          |
| audible fun   | nction.      |                |               |                |                                       |                               |           |          |
|               |              |                |               |                |                                       |                               |           |          |
| The user c    | an not swite | ch off all th  | e alarms si   | multaneous     | ly                                    |                               |           |          |
|               |              | £              |               |                | JaO                                   |                               |           |          |
| Doos the v    |              |                |               |                |                                       |                               | l .       |          |
| Does the v    | ibratory ala | IIII IUIICIIOI | as specille   | ed, if availat | , , , , , , , , , , , , , , , , , , , |                               |           |          |
|               |              | ini iunction   | i as specille | ed, if availat | ЛС :                                  |                               |           |          |
| Does the v    |              | THI IUIICUOI   | as specific   | ed, if availab |                                       |                               |           |          |
|               |              | in idiretion   | as specific   | ed, if availab |                                       |                               |           |          |
|               |              | THI Idriction  | as specille   | ed, if availab |                                       |                               |           |          |
|               |              | THI Idiletion  | as specific   | ed, if availab |                                       |                               |           |          |
|               |              | THI Idiletion  | as specific   | ed, if availab |                                       |                               |           |          |
|               |              |                | as specific   | ed, if availab |                                       |                               |           |          |
|               |              |                | as specific   | ed, if availab |                                       |                               |           |          |
|               |              |                | as specifie   | ed, if availab |                                       |                               |           |          |
|               |              |                | as specific   | ed, if availab |                                       | Date:                         |           |          |
| Comments:     |              |                | as specific   | ed, if availab |                                       | Date:                         |           |          |



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|               |            | ··· • · · -   | - Expio       | sive At         | mosph        | eres                      |               |        |
|---------------|------------|---------------|---------------|-----------------|--------------|---------------------------|---------------|--------|
|               |            | Test          | Data a        | nd Rep          | ort          |                           |               |        |
|               |            |               |               |                 |              |                           |               |        |
| Manufacturer: |            |               | 0 .           |                 |              |                           |               |        |
| Model:        |            |               | Seria         | I Number:       |              |                           |               |        |
|               | 7          |               |               |                 |              |                           |               |        |
| Requirements: |            |               |               |                 |              | mentation s               |               |        |
|               |            |               | tification sh |                 |              |                           | stiali e prov | waea n |
|               |            |               |               |                 |              |                           |               |        |
| Note:         | Comments   | s are require | ed when the   | requireme       | nt is not ve | rified.                   | •             |        |
|               |            |               |               |                 |              |                           |               |        |
|               |            |               |               |                 |              |                           |               |        |
|               |            |               |               |                 |              |                           |               |        |
|               |            |               |               |                 |              |                           |               |        |
|               |            |               |               |                 |              |                           |               | rify   |
|               |            | la tha ina    | tw.ma.ant.aa  | difficul for ou | nlasi n sta  |                           | Yes           | N      |
|               |            | is the ins    | trument ce    | itilied for ex  | piosive atri | iosprieres?               |               |        |
|               |            |               |               |                 |              |                           |               |        |
|               |            | If ce         | rtified has   | documented      | nroof bee    | n provided?               |               |        |
|               |            | If ce         | rtified, has  | documented      | d proof bee  | n provided?               |               |        |
| ls co         | mpliance b |               |               |                 |              |                           |               |        |
| ls co         | mpliance t |               |               |                 |              | n provided?<br>-913-2002? |               |        |
| ls co         | mpliance b |               |               |                 |              |                           |               |        |
| ls co         | mpliance t |               |               |                 |              |                           |               |        |
| ls co         | mpliance t |               |               |                 |              |                           |               |        |
|               | mpliance t |               |               |                 |              |                           |               |        |
| Is co         | mpliance t |               |               |                 |              |                           |               |        |
|               | mpliance b |               |               |                 |              |                           |               |        |
|               | mpliance t |               |               |                 |              |                           |               |        |
|               | mpliance t |               |               |                 |              |                           |               |        |
|               | mpliance t |               |               |                 |              |                           |               |        |
|               | mpliance b |               |               |                 |              |                           |               |        |
| Comments:     | mpliance t |               |               |                 |              |                           |               |        |
|               | mpliance b |               |               |                 |              |                           |               |        |
| Comments:     | mpliance t |               |               |                 |              | -913-2002?                |               |        |



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| 3                         | CCHOII 0        |                | ation Dete       |                 | reshous         |                |       |
|---------------------------|-----------------|----------------|------------------|-----------------|-----------------|----------------|-------|
|                           |                 | i est L        | Data and F       | Report          |                 |                |       |
| la musta atuura v         |                 |                |                  |                 |                 |                |       |
| /lanufacturer:<br>  Model |                 |                | Seri             | al Number:      |                 |                |       |
| moder.                    |                 |                | OCITI            | di Namber.      |                 |                |       |
| Requirement:              | Significant cl  | hanges in th   | ne measured ra   | diation level   | shall be indic  | ated visuall   | y and |
|                           | be proportion   |                | posure rate. A   |                 | ible indication | n that is prop | oorti |
|                           | the field's int | tensity shall  | also be availab  | ole.            |                 |                |       |
|                           | The instrume    | ent shall ind  | icate a change   | in exposure     | rate within 2   | S.             |       |
|                           |                 |                | J                | •               |                 |                |       |
|                           |                 |                |                  |                 |                 |                |       |
| Note:                     | Comments        | are required   | d when the requ  | uirement is r   | not verified.   |                |       |
| <u> </u>                  | 1               |                | 1                |                 |                 |                |       |
| Ambient (                 | Conditions:     |                | °C               |                 | %RH             |                | in    |
| Ambient                   | Jonathons.      |                | 0                |                 | 701411          |                |       |
| Sc                        | ource data:     |                |                  |                 |                 |                |       |
| T . F .                   |                 |                |                  |                 |                 |                |       |
| Test Equip                | ment Used:      |                |                  |                 |                 |                |       |
|                           |                 |                | Test Re          | oulto           |                 |                |       |
|                           |                 |                | 1est Ke          | Suits           |                 |                | 1     |
|                           |                 | Requ           | iirement         |                 |                 | Yes            |       |
| The instrun               | nent indicate   | d an increas   | se in the level  | of radiation v  | within 2        |                |       |
| seconds fo                | llowing an ex   | cposure to a   | an instantaneo   | us increase     | in the          |                |       |
| ll l                      |                 | of 50 μR/h a   | bove the ambie   | ent backgrou    | und level       |                |       |
| from a <sup>137</sup> C   | s source.       |                |                  |                 |                 |                |       |
| The display               | ed exposure     | rate indica    | tion was withir  | 1 ± 50% of th   | he new          |                |       |
| radiation le              | vel within 5 s  | seconds of t   | he increase in   | the level of    | radiation.      |                |       |
| The instrun               | nent indicate   | d a decreas    | se in the radiat | ion level with  | nin 2           |                |       |
| seconds w                 | hen the radia   | ation field wa | as returned to   | its original le | evel.           |                |       |
|                           |                 |                | tion was withir  |                 |                 |                |       |
| radiation le              | vel within 5 s  | seconds of t   | the decrease o   | f the level of  | radiation.      |                |       |
|                           |                 |                |                  |                 |                 |                |       |
| Comments:                 |                 |                |                  |                 |                 |                |       |
|                           |                 |                |                  |                 |                 |                |       |
|                           |                 |                |                  |                 |                 |                |       |
|                           |                 |                |                  |                 |                 |                |       |
|                           |                 |                |                  |                 |                 |                |       |
|                           |                 |                |                  |                 |                 |                |       |
|                           |                 |                |                  |                 | Doto            |                |       |
| ompleted by:              |                 |                |                  | 1               | Date:           |                | _     |
| ompleted by:              |                 |                |                  |                 | Date:           |                |       |



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|                    | Tes           | st Data a    | nd Rep            | ort            |             |                                       |  |
|--------------------|---------------|--------------|-------------------|----------------|-------------|---------------------------------------|--|
| Manufacturer:      |               |              |                   |                |             |                                       |  |
| Model:             |               |              | Seria             | al Number:     |             |                                       |  |
| Requirement:       | radiation fro |              | III not excee     | ed ± 30% for e |             | t to the referen-<br>rates from 0.1 r |  |
| Note:              | Comments      | are required | when the re       | equirement is  | not verifie | ed.                                   |  |
| mbient Conditions: |               | °C           |                   | %RH            |             | in HG                                 |  |
| So                 | urce data:    |              |                   |                |             |                                       |  |
| Test Equipn        | nent Used:    |              |                   |                |             |                                       |  |
| Manu               | facturer sta  | ated maxim   | um range:         |                | mR/h        |                                       |  |
|                    |               | <u>N</u>     | <u>lleasureme</u> | nt Results     |             |                                       |  |
|                    | 0.1           | mR/h         | 5                 | mR/h           | 0.0         | mR/h                                  |  |
| 1                  |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| 2                  |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| 3                  |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| 4                  |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| 5                  |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| 6                  |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| 7                  |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| 8                  |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| 9                  |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| 10                 |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| Mean               |               | mR/h         |                   | mR/h           |             | mR/h                                  |  |
| Acceptance Range   | 0.07          | 0.13         | 3.50              | 6.50           | 0.00        | 0.00                                  |  |



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|               |           | Test R               |                   |           |    |
|---------------|-----------|----------------------|-------------------|-----------|----|
|               | Verify th | nat results are with | in the acceptance | range     |    |
| 0.1 m         | R/h       | 5 m                  | R/h               | 80 % of m |    |
| Yes           | No        | Yes                  | No                | Yes       | No |
|               |           |                      |                   |           |    |
|               |           |                      |                   |           |    |
|               |           |                      |                   |           |    |
| Comments:     |           |                      |                   |           |    |
|               |           |                      |                   |           |    |
|               |           |                      |                   |           |    |
|               |           |                      |                   |           |    |
|               |           |                      |                   |           |    |
| Completed by: |           |                      | Date:             |           |    |
| Reviewed by:  |           |                      | Date:             |           |    |
| Reviewed by:  |           |                      | Date:             |           |    |



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|                                     | Section                   | 1 6.4 Ra                   | diation De  | etection                     | Alarm         |     |          |
|-------------------------------------|---------------------------|----------------------------|---|------------------------------|---------------|-----|----------|
|                                     |                           | Test D                     | ata and F   | Report                       |               |     |          |
| lanufacturer:                       |                           |                            |   |                              |               |     |          |
| Model:                              |                           |                            | Seria   | ıl Number:                   |               |     |          |
|                                     |                           |                            |   |                              |               |     |          |
| lequirement:                        | alarm thresh              | nold.                      | rm when expose  |                              |               |     | than the |
| Note:                               | Comments                  | are required               | d when the requ   | irement is r                 | not verified. |     |          |
| Ambient (                           | Conditions:               |                            | °C  |                              | %RH           |     | in HG    |
| Sc                                  | ource data:               |                            |   |                              |               |     |          |
| Test Equip                          | nent Used:                |                            |   |                              |               |     |          |
|                                     |                           |                            | Test Re   | sults                        |               |     |          |
|                                     |                           | Requ                       | iirement  |                              |               | Yes | No       |
| exposed to                          | a 2 mR/hr r               | adiation field             | to 1 mR/hr and<br>d produced by <sup>1</sup><br>acreased expos                                    | <sup>137</sup> Cs, the a     |               |     |          |
| the flux em 2 x 10 <sup>4</sup> n/s | itted from an ± 20 % (~0. | n unmoderat<br>01 µg) plac | to a <sup>252</sup> Cf neut<br>ed <sup>252</sup> Cf source<br>ced approximate<br>ated within 2 se | with a fluer<br>ely 25 cm fr | nce rate of   |     |          |
| Comments:                           |                           |                            |   |                              |               |     |          |
|                                     |                           |                            |   |                              |               |     |          |
|                                     |                           |                            |   |                              |               |     |          |
|                                     |                           |                            |   |                              |               |     |          |
|                                     |                           |                            |   |                              |               |     |          |
|                                     |                           |                            |   |                              |               |     |          |
| mpleted by:                         |                           |                            |   |                              | Date:         |     |          |
| Reviewed by:                        |                           |                            |   |                              | Date:         |     |          |
|                                     |                           |                            |   |                              | 24.5.         |     |          |



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|                |   | Test Da   | ata and Re   | eport   |  |  |                              |
|----------------|---|---|--|---|--|--|------------------------------|
| Manufacturer:  |   |   |  |   |  |  |                              |
| Model:         |   |   | Se   | rial Number:  |  |  |                              |
| GGG11          |   |   |  |   |  |  |                              |
| Requirement:   | identifies the is considere the daughter If a library is listed in 6.5. testing processome exam  a) Region sub) Peak fittin | e radionuclide<br>d not acceptal<br>(s) of the radio<br>used as part of<br>1 for test purp-<br>ess.<br>rs shall speci-<br>ples are:<br>umming<br>g<br>ares analysis | lides, test result (s) of interest, or ble if the instrun onuclide(s) of in of the identificati oses as a minir fy which analysis          | r that radionucl<br>nent identifies u<br>terest.<br>on process, it s<br>num, and it sha   | ide(s) and e<br>unexpected<br>shall contai<br>all not be al  | expected dan<br>radionuclide<br>n the radion<br>tered during<br>instrument o             | ught<br>es o<br>uclid<br>the |
|                | Test require the analysis   | ments shall be  |  | h available mo  |  |  |                              |
| Categorization | listed in four  | different cated   | gories.<br>ative list and sho  |   | sidered as   | all-inclusive  |                              |
|                | Special Nuc   | car materials.  | : Uranium (used  | to indicate <sup>233</sup> l  | J, <sup>235</sup> U), <sup>237</sup> N   | p, Pu.   |                              |
|                | Medical radi  | onuclides: <sup>18</sup> F.<br><sup>33</sup> Xe.  | : Uranium (used<br>, <sup>67</sup> Ga, <sup>51</sup> Cr, <sup>75</sup> Se<br>ctive materials (   | e, <sup>89</sup> Sr, <sup>99</sup> Mo, <sup>99</sup> m  | nTc, <sup>103</sup> Pd, <sup>1</sup>   | <sup>11</sup> ln, lodine (   |                              |
|                | Medical radi<br><sup>153</sup> Sm, <sup>201</sup> Tl,<br>Naturally occ<br>daughters.  | onuclides: <sup>18</sup> F<br><sup>33</sup> Xe.<br>curring radioad  | , <sup>67</sup> Ga, <sup>51</sup> Cr, <sup>75</sup> Se   | e, <sup>89</sup> Sr, <sup>99</sup> Mo, <sup>99</sup> m<br>NORM): <sup>40</sup> K, <sup>226</sup>  | nTc, <sup>103</sup> Pd, <sup>1</sup> '<br>Ra, <sup>232</sup> Th an                                 | <sup>11</sup> ln, lodine (   |                              |
| Requirements:  | Medical radii 153Sm, 201Tl, Naturally occ daughters. Industrial radii 6.5.2 The ma  | onuclides: <sup>18</sup> F  33Xe.  curring radioac  dionuclides: <sup>57</sup> anufacturer sh   | , <sup>67</sup> Ga, <sup>51</sup> Cr, <sup>75</sup> Sective materials ( <sup>1</sup> /Co, <sup>60</sup> Co, <sup>133</sup> Ba,             | e, <sup>89</sup> Sr, <sup>99</sup> Mo, <sup>99</sup> m<br>NORM): <sup>40</sup> K, <sup>226</sup><br>1 <sup>37</sup> Cs, <sup>192</sup> Ir, <sup>204</sup> Ti<br>ionuclides that                 | nTc, <sup>103</sup> Pd, <sup>1</sup> Ra, <sup>232</sup> Th an , <sup>226</sup> Ra, and             | <sup>11</sup> In, lodine ( <sup>2</sup> ad daughters  I <sup>241</sup> Am.  nent can ide | s, <sup>238</sup> l<br>ntify |
| Requirements:  | Medical radii 153Sm, 201Tl, Naturally occ daughters. Industrial rad 6.5.2 The matheir categor                               | onuclides: <sup>18</sup> F surring radioad dionuclides: <sup>57</sup> anufacturer sh y. The categor   | , <sup>67</sup> Ga, <sup>51</sup> Cr, <sup>75</sup> Sective materials ( <sup>7</sup> Co, <sup>60</sup> Co, <sup>133</sup> Ba, <sup>8</sup> | e, <sup>89</sup> Sr, <sup>99</sup> Mo, <sup>99</sup> m<br>NORM): <sup>40</sup> K, <sup>226</sup><br>1 <sup>37</sup> Cs, <sup>192</sup> Ir, <sup>204</sup> T<br>ionuclides that<br>ould be based | nTc, <sup>103</sup> Pd, <sup>1</sup> Ra, <sup>232</sup> Th an , <sup>226</sup> Ra, and the instrum | nd daughters I <sup>241</sup> Am. nent can ide   | ntify:                       |



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| analysis modes u | ised to identify | / radionuclides:  |                  |                 |       |    |   |
|------------------|------------------|-------------------|------------------|-----------------|-------|----|---|
|                  |                  |                   |                  |                 |       |    |   |
|                  |                  |                   |                  |                 |       |    |   |
|                  |                  |                   |                  |                 | Voo   | Na |   |
| T                | <u> </u>         |                   | 141 11 4         |                 | Yes   | No | 1 |
| The manufacturer | provided a lis   | it of radionuclid | es and the list  | is categorized  |       |    |   |
|                  |                  |                   |                  |                 |       |    |   |
| oes the instrume | nt library cont  | ain the radionuc  | clides listed in | section 6.5.1?  |       |    |   |
|                  | •                |                   |                  |                 |       |    |   |
|                  |                  |                   |                  |                 |       |    |   |
| The inetri       | ıment displayı   | s the identified  | radionuclide ar  | nd its category |       |    | 1 |
| The instru       | ument display    | s the identified  | radionuclide ar  | nd its category |       |    |   |
| The instru       | ıment display    | s the identified  | radionuclide ar  | nd its category |       |    |   |
| The instru       | ument display    | s the identified  | radionuclide ar  | nd its category |       |    |   |
| The instru       |                  | s the identified  | radionuclide ar  | nd its category |       |    |   |
|                  |                  | s the identified  | radionuclide ar  | nd its category |       |    |   |
|                  |                  | s the identified  | radionuclide ar  | nd its category |       |    |   |
|                  |                  | s the identified  | radionuclide ar  | nd its category |       |    |   |
|                  |                  | s the identified  | radionuclide ar  | nd its category |       |    |   |
|                  |                  | s the identified  | radionuclide ar  | nd its category |       |    |   |
| Comme            | nts              | s the identified  | radionuclide ar  | nd its category |       |    |   |
|                  | nts              | s the identified  | radionuclide ar  | nd its category | Date: |    |   |
| Comme            | nts<br>By:       | s the identified  | radionuclide ar  | nd its category | Date: |    |   |



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|                                 | 00000  |                                      |   | uclide Idei   |  |   |                    |
|---------------------------------|--|--------------------------------------|---|---|--|---|--------------------|
|                                 |  |                                      | Test Data   | and Repor   | t  |   |                    |
| Manufacture                     | ··   |                                      |   |   |  |   |                    |
| Model                           |  |                                      |   | Serial Number:  |  |   |                    |
|                                 |  |                                      |   |   |  |   |                    |
| Requirement                     |  |                                      |   |   |  |   | manufacturer with  |
|                                 | maximum of 2 n                                       | ninutes. The man                     | iutacturer snall p                                      | rovide radionuciio  | ie-specific test                         | results.  |                    |
|                                 | Unshielded:  |                                      |   |   |  |   |                    |
|                                 | <sup>40</sup> K, <sup>57</sup> Co, <sup>60</sup> Co, | $^{67}$ Ga, $^{99m}$ Tc, $^{125}$ I, | , <sup>131</sup> I, <sup>133</sup> Ba, <sup>137</sup> C | s, <sup>192</sup> Ir, <sup>201</sup> TI, <sup>226</sup> I | Ra, <sup>232</sup> Th, <sup>233</sup> U, | $^{235}$ U, $^{238}$ U, Pu*, $^{2}$                   | <sup>241</sup> Am. |
|                                 |  |                                      |   |   |  |   |                    |
|                                 |  | steel shielding:                     | 131, 1330 - 1376  | . 1921 201 <del>-1</del> 226                              | D - 232Tr - 233LL                        | <sup>235</sup> U, <sup>238</sup> U, Pu*, <sup>2</sup> | 241 a              |
|                                 | - K, - Co, - Co,                                     | Ga, Tic, Tic                         | ,,ва,С  | s, ·Ir, 11,   | Ra, In,U,                                | U,U, Pu <sup></sup> , -                               | Am.                |
|                                 | * Reactor grade                                      | plutonium                            |   |   |  |   |                    |
|                                 |  |                                      |   |   |  |   |                    |
| Note                            | : Comments are                                       | required when the                    | requirement is  | not verified  |  | -   | +                  |
| Note                            | . Comments are i                                     | required when the                    | , requirement is  | not vermed.   |  |   |                    |
|                                 |  | 00                                   |   | 0/ DU   |  | :- 110  |                    |
| Ambient Conditions              | š:   | °C                                   |   | %RH   |  | in HG   |                    |
| Test Equipment Used             | J:   |                                      |   |   |  |   |                    |
|                                 |  |                                      |   |   |  |   |                    |
|                                 |  |                                      |   | tion Results  |  |   |                    |
| K-40                            | Co-57  | Co-60                                | Ga-67   | Tc-99m  | I-125                                    | I-131   | Ba-133             |
| Source ID<br>Date               | _  |                                      |   |   |  | <u> </u>  |                    |
| 1                               | -  |                                      |   |   |  | <del> </del>  |                    |
| 2                               |  |                                      |   |   |  |   |                    |
| 3                               |  |                                      |   |   |  |   |                    |
| 5                               |  |                                      |   |   |  |   |                    |
| 6                               |  |                                      |   |   |  |   |                    |
| 7                               |  |                                      |   |   |  |   |                    |
| 8                               |  |                                      |   |   |  |   |                    |
| 9                               |  |                                      |   |   |  | -   |                    |
| # Correct                       | _  |                                      |   |   |  | 1   |                    |
| 00.1.00.                        |  |                                      |   |   |  |   |                    |
|                                 |  |                                      |   |   |  |   |                    |
| Cs-137                          | Ir-192   | TI-201                               | Ra-226  | Th-232  | U-233                                    | U-235   | U-238              |
| ource ID                        | _  |                                      |   |   |  |   |                    |
| Datoll                          | -  |                                      | <del>                                     </del>        |   |  | <del>                                     </del>      |                    |
| Date 1                          |  |                                      |   |   |  | 1   |                    |
| 1 2                             | 1  |                                      |   |   |  |   | 1                  |
| 1<br>2<br>3                     |  |                                      |   |   |  |   |                    |
| 1<br>2<br>3<br>4                |  |                                      |   |   |  |   |                    |
| 1<br>2<br>3<br>4<br>5           |  |                                      |   |   |  |   |                    |
| 1<br>2<br>3<br>4                |  |                                      |   |   |  |   |                    |
| 1 2 3 4 5 6 7 8                 |  |                                      |   |   |  |   |                    |
| 1<br>2<br>3<br>4<br>5<br>6<br>7 |  |                                      |   |   |  |   |                    |



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| <u> </u>  | RGPu   | Am-241   |        |                 |                |          |       |        |
|-----------|--------|----------|--------|-----------------|----------------|----------|-------|--------|
| Source ID | RGFu   | AIII-241 |        |                 |                |          |       |        |
| Date      |        |          |        |                 |                |          |       |        |
| 1         |        |          |        |                 |                |          |       |        |
| 2         |        |          |        |                 |                |          |       |        |
| 3         |        |          |        |                 |                |          |       |        |
| 4         |        |          |        |                 |                |          |       |        |
| 5         |        |          |        |                 |                |          |       |        |
| 6         |        |          |        |                 |                |          |       |        |
| 7         |        |          |        |                 |                |          |       |        |
| 8         |        |          |        |                 |                |          |       |        |
| 9         |        |          |        |                 |                |          |       |        |
| 10        |        |          |        |                 |                |          |       |        |
| # Correct |        |          |        |                 |                |          |       |        |
|           |        |          |        |                 |                |          |       |        |
|           |        |          | Isotop | e Identificatio | on Results - S | Shielded |       |        |
|           | K-40   | Co-57    | Co-60  | Ga-67           | Tc-99m         | I-125    | I-131 | Ba-133 |
| ource ID  |        |          |        |                 |                |          |       |        |
| Date      |        |          |        |                 |                |          |       |        |
| 1         |        |          |        |                 |                |          |       |        |
| 2         |        |          |        |                 |                |          |       |        |
| 3         |        |          |        |                 |                |          |       |        |
| 4<br>5    |        |          |        |                 |                |          |       |        |
| 6         |        |          |        |                 |                |          |       |        |
| 7         |        |          |        |                 |                |          |       |        |
| 8         |        |          |        |                 |                |          |       |        |
| 9         |        |          |        |                 |                |          |       |        |
| 10        |        |          |        |                 |                |          |       |        |
| # Correct |        |          |        |                 |                |          |       |        |
|           |        |          |        |                 |                |          |       |        |
|           | Cs-137 | Ir-192   | TI-201 | Ra-226          | Th-232         | U-233    | U-235 | U-238  |
| ource ID  |        |          |        |                 |                |          |       |        |
| Date      |        |          |        |                 |                |          |       |        |
| 1         |        |          |        |                 |                |          |       |        |
| 2         |        |          |        |                 |                |          |       |        |
| 3         |        |          |        |                 |                |          |       |        |
| 4         |        |          |        |                 |                |          |       |        |
| 5         |        |          |        |                 |                |          |       |        |
| 6         |        | <b>∤</b> |        |                 |                |          |       |        |
| 7         |        | <b>∦</b> |        |                 |                |          |       |        |
| 8         |        | ╂        |        | -               |                |          |       |        |
|           |        | II II    |        |                 |                |          |       |        |
| 10        |        |          |        |                 |                |          |       |        |



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|           | DOD.:     | A 0.4.4   | 7                   | T                |                     |     | 1     |
|-----------|-----------|-----------|---------------------|------------------|---------------------|-----|-------|
|           | RGPu      | Am-241    |                     |                  |                     |     |       |
| Source ID |           |           | _                   |                  |                     |     |       |
| Date      |           |           |                     |                  |                     |     |       |
| 1         |           |           | 1                   |                  |                     |     |       |
| 2         |           |           |                     |                  |                     |     |       |
| 3         |           |           | 1                   |                  |                     |     |       |
| 4         |           |           | -                   |                  |                     |     |       |
| 5         |           |           | 1                   |                  |                     |     |       |
| 6         |           |           |                     |                  |                     |     |       |
| 7         |           |           | _                   |                  |                     |     |       |
| 8         |           |           | -                   |                  |                     |     |       |
| 9         |           |           |                     |                  |                     |     |       |
| 10        |           |           | -                   |                  |                     |     |       |
|           |           |           | 4                   |                  |                     |     |       |
| # Correct |           |           | <u> </u>            |                  |                     |     |       |
|           |           |           |                     |                  |                     |     |       |
|           |           |           |                     |                  |                     |     |       |
|           |           |           |                     |                  |                     |     |       |
|           |           |           |                     |                  |                     | Yes | No    |
|           |           |           |                     |                  |                     |     | 110   |
|           |           | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     | 140   |
|           |           | The manuf | acturer provided ra | adionuclide-spec | cific test results? |     | 110   |
|           |           | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     |       |
|           |           | The manuf | acturer provided ra | adionuclide-spec | sific test results? |     |       |
|           | Commente  | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     | NO    |
|           | Comments: | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     | NO NO |
|           | Comments: | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     | 110   |
|           | Comments: | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     | 110   |
|           | Comments: | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     | 110   |
|           | Comments: | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     | 110   |
|           |           | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     |       |
|           | Comments: | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     | Date: |
|           |           | The manuf | acturer provided ra | adionuclide-spec | ific test results?  |     |       |



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|     | Section         | 6.7 Simu     | Itaneous F                            | Radionuc        | clide Ide       | ntificatio     | n            |            |
|-----|-----------------|--------------|---------------------------------------|-----------------|-----------------|----------------|--------------|------------|
|     |                 | 1            | Test Data a                           | nd Repo         | ort             |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
| Ма  | nufacturer:     |              |                                       |                 |                 |                |              |            |
|     | Model:          |              |                                       | Ser             | ial Number:     |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
| Re  | equirement:     | The instrume | ent shall be able                     | to identify a r | ninimum of tv   | vo radionuclio | les simultan | eously.    |
|     |                 |              | dentifications sha<br>chever is less. | all be perform  | ed within the   | time specified | d by the ma  | nufacturer |
|     |                 |              |                                       |                 |                 |                |              |            |
|     | Note:           | Comments a   | re required wher                      | the requirem    | nent is not ver | rified.        |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     | Ambient         | Conditions:  |                                       | °C              |                 | %RH            |              | in HG      |
|     |                 |              |                                       |                 |                 |                |              |            |
|     | S               | ource data:  |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     | Test Equip      | ment Used:   |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              | Isotope Identifi                      | cation Resul    | <u>ts</u>       |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              | D 133 0 DOD                           |                 |                 |                |              |            |
|     |                 |              | Ba <sup>133</sup> & RGPu              |                 |                 |                |              |            |
|     |                 | 1            |                                       |                 |                 |                |              |            |
|     |                 | 2            |                                       |                 |                 |                |              |            |
|     |                 | 3            |                                       |                 |                 |                |              |            |
|     |                 | 4            |                                       |                 |                 |                |              |            |
|     |                 | 5            |                                       |                 |                 |                |              |            |
|     |                 | 6            |                                       |                 |                 |                |              |            |
|     |                 | 7            |                                       |                 |                 |                |              |            |
|     |                 | 8            |                                       |                 |                 |                |              |            |
|     |                 | 9            |                                       |                 |                 |                |              |            |
|     |                 | 10           |                                       |                 |                 |                |              |            |
|     | Nur             | mber Correct |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     | Comments:       |              |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |
|     |                 |              |                                       |                 |                 | <b>.</b> .     |              |            |
| Cor | mpleted by:     |              |                                       |                 |                 | Date:          |              |            |
| Г.  | المالة مستمالية |              |                                       |                 |                 | D-4:           |              |            |
| Re  | viewed by:      |              |                                       |                 |                 | Date:          |              |            |
|     |                 |              |                                       |                 |                 |                |              |            |



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|               |  | Test Data   | and Repo                                       | ort                            |                                       |                  |
|---------------|--|---|--|--------------------------------|---------------------------------------|------------------|
| Manufacturer: |  |   |  |                                |                                       |                  |
| Model:        |  |   | Seria  | al Number:                     |                                       |                  |
| Requirement:  | The instrument   | ment for Gamr<br>t shall be able to<br>round from natur         | o identify the ra                              | dionuclide of                  | interest in the                       | presence of an   |
|               |  | entification of <sup>23</sup><br>date is performe<br>o sources. |  |                                |                                       |                  |
|               |  |   |  |                                |                                       |                  |
|               |  |   |  |                                |                                       |                  |
|               | C O 4 D!   | ment for Beta   |  |                                |                                       |                  |
| Requirement:  | 6.9.1 Require  | ment for beta   |  |                                |                                       |                  |
| Requirement   | The instrument   | shall identify a peta-emitting rac                              |  | interest whe                   | en exposed to t                       | he radiation em  |
| Requirement:  | The instrument shielded pure to the when exposed                       | shall identify a  | dionuclide.<br>I beta emitter o                | nly, the iden                  | tification result                     | shall not includ |
|               | The instrument shielded pure to when exposed unexpected rate emitter". | t shall identify a peta-emitting rad                            | dionuclide.  I beta emitter of should indicate | nly, the iden<br>"not identifi | tification result<br>ed" radionuclide | shall not includ |



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| Ambie          | nt Conditions: |        | °C             |               | %RH          |           | in HG    |
|----------------|----------------|--------|----------------|---------------|--------------|-----------|----------|
|                |                |        |                |               |              |           |          |
|                | ce data:       |        |                |               |              |           |          |
| gamma-ray      | y interference |        |                |               |              |           |          |
| Sour           | ce data:       |        |                |               |              |           |          |
|                | terference     |        |                |               |              |           |          |
| Deta III       | terrerenee     |        |                |               |              |           |          |
| Toot Equ       | ipment Used:   |        |                |               |              |           |          |
| Test ⊑qu       | iipineni osea. |        |                |               |              |           |          |
|                |                | Radi   | onuclide Ident | ification Res | <u>sults</u> |           |          |
|                |                | TI 000 |                |               |              | - 1 -     |          |
|                | Gamma -        | In-232 | _              |               | В            | eta<br>T  | 1        |
|                | Am-241         | Co-60  |                |               | Cs-137       | Beta Only |          |
| Date           |                |        |                | Date          |              |           |          |
| 1              |                |        |                | 1             |              |           | 1        |
| 2              |                |        |                | 2             |              |           |          |
| 3              |                |        |                | 3             |              |           |          |
| 4              |                |        |                | 4             |              |           |          |
| 5              |                |        |                | 5<br>6        |              |           |          |
| 7              |                |        |                | 7             |              |           |          |
| 8              |                |        |                | 8             |              |           |          |
| 9              |                |        |                | 9             |              |           |          |
| 10             |                |        |                | 10            |              |           |          |
| Number Correct |                |        | Num            | ber Correct   |              |           | <u> </u> |
| 0              |                |        |                |               |              |           |          |
| Comments:      |                |        |                |               |              |           |          |
|                |                |        |                |               |              |           |          |
|                |                |        |                |               |              |           |          |
| Completed by:  |                |        |                | Date:         |              |           |          |
| <u> </u>       |                |        |                |               |              |           |          |



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|       |             | Sect  | ion 6.10         | False Id       | entificat    | ion            |     |       |
|-------|-------------|---|------------------|----------------|--------------|----------------|-----|-------|
|       |             |   | Test Da          | ta and F       | Report       |                |     |       |
|       |             |   |                  |                |              |                |     |       |
| Ma    | nufacturer: |   |                  |                |              |                |     |       |
|       | Model:      |   |                  | Ser            | ial Number:  |                |     |       |
|       |             |   |                  |                |              |                |     |       |
| D-    |             | The sine standard                             | امنا عمد الممامة |                |              |                |     | -41:  |
| Ke    | quirement:  | The instrumer stable and lov stating that the | v ambient rac    | liation backgr | ound. An inc | dication shall |     |       |
|       |             |   |                  |                |              |                |     |       |
|       | Note:       | Comments ar                                   | e required wh    | en the requir  | ement is not | verified.      |     |       |
|       |             |   |                  |                |              |                |     |       |
|       |             |   |                  |                |              |                |     |       |
|       | Ambien      | t Conditions:                                 |                  | °C             |              | %RH            |     | in HG |
|       |             |   |                  |                |              |                |     |       |
|       | Test Equi   | pment Used:                                   |                  |                |              |                |     |       |
|       |             | _   |                  |                |              |                |     |       |
|       |             | Iso   | tope Identifi    | cation Resu    | <u>Its</u>   |                |     |       |
|       |             |   |                  |                |              |                |     |       |
|       |             | ID no source                                  |                  |                |              |                |     |       |
|       | 1           |   |                  |                |              |                | Yes | No    |
|       | 2           |   |                  | Did instrum    |              | ove closer" or |     |       |
|       | 3           |   |                  |                | "field t     | oo low", etc?  |     |       |
|       | 4           |   |                  |                |              |                |     |       |
|       | 5           |   |                  |                |              |                |     |       |
|       | 6           |   |                  |                |              |                |     |       |
|       | 7<br>8      |   |                  |                |              |                |     |       |
|       | 9           |   |                  |                |              |                |     |       |
|       | 10          |   |                  |                |              |                |     |       |
| Num   | ber Correct |   |                  |                |              |                |     |       |
| Itain | 501 0011001 |   |                  |                |              |                |     |       |
|       | Comments:   |   |                  |                |              |                |     |       |
|       |             |   |                  |                |              |                |     |       |
|       |             |   |                  |                |              |                |     |       |
|       |             |   |                  |                |              |                |     |       |
|       |             |   |                  |                |              |                |     |       |
| Co    | mpleted by: |   |                  |                |              | Date:          |     |       |
|       |             |   |                  |                |              |                |     |       |
| Re    | viewed by:  |   |                  |                |              | Date:          |     |       |
|       |             |   |                  |                |              |                |     |       |



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| Section               | 6.11 Inte               | rferenc       | e from S        | urround       | ing Mate       | erial               |    |
|-----------------------|-------------------------|---------------|-----------------|---------------|----------------|---------------------|----|
|                       |                         |               | a and Re        |               | _              |                     |    |
| Manufacturer:         |                         |               |                 |               |                |                     |    |
| Mandiacturer.  Model: |                         |               | Ser             | ial Number:   |                | ļ                   | _  |
|                       |                         |               |                 |               |                |                     |    |
| Requirement:          | The instrumer radiation | nt shall be a | ble to identify | radionuclides | s in the prese | ence of backscatter | ed |
| Note:                 | Comments ar             | re required w | hen the requ    | rement is not | verified.      |                     |    |
| Ambient Conditions:   | C                       | °C            |                 | %RH           |                | in HG               | =  |
| Source data:          |                         |               |                 |               |                |                     |    |
| Test Equipment Used:  |                         |               |                 |               |                |                     |    |
|                       |                         |               |                 |               |                |                     |    |
| l l                   | Rad                     | dionuclide    | Identificatio   | n Results     |                |                     |    |
|                       |                         |               |                 |               |                |                     |    |
|                       |                         |               | Cs-137          |               |                |                     |    |
|                       |                         | 1             |                 |               |                |                     |    |
|                       |                         | 2<br>3        |                 |               |                |                     |    |
|                       |                         | 4             |                 |               |                |                     |    |
|                       |                         | 5             |                 |               |                |                     |    |
|                       |                         | 6             |                 |               |                |                     |    |
|                       |                         | 7             |                 |               |                |                     |    |
|                       |                         | 8             |                 |               |                |                     |    |
|                       |                         | 9<br>10       |                 |               |                |                     |    |
|                       | Numl                    | per Correct   |                 |               |                |                     |    |
|                       |                         |               |                 |               |                |                     |    |
| Comments:             |                         |               |                 |               |                |                     |    |
|                       |                         |               |                 |               |                |                     |    |
|                       |                         |               |                 |               |                |                     |    |
|                       |                         |               |                 |               |                |                     | _  |
| Performed by:         |                         |               |                 | Date:         |                |                     |    |
| Reviewed by:          |                         |               |                 | Date:         |                |                     |    |
|                       |                         |               |                 |               |                |                     |    |



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|             |               |                                  | Test Da        | ta and Re        | port               |                 |                   |               |
|-------------|---------------|----------------------------------|----------------|------------------|--------------------|-----------------|-------------------|---------------|
|             |               |                                  |                |                  |                    |                 |                   |               |
| Manuf       | acturer:      |                                  |                |                  |                    |                 |                   |               |
|             | Model:        |                                  |                | Se               | erial Number:      |                 | ·                 |               |
|             |               |                                  |                |                  |                    |                 |                   |               |
| Requir      | ements:       | The identificati of orientation. | on of radionuc | lides shall be a | cceptable over     | incident angles | from 0° to ± 45°. | Include pictu |
|             | Note:         | Comments are                     | required wher  | n the requireme  | nt is not verified | d.              |                   |               |
| nbient Cor  | ditions       |                                  | °C             |                  | %RH                |                 | in HG             |               |
| inbient Cor | iditions.     |                                  | C              |                  | /0 Ki i            |                 | IIIIIG            |               |
| Sour        | ce data:      |                                  |                |                  |                    |                 |                   |               |
|             |               |                                  |                |                  |                    |                 |                   |               |
| t Equipme   | nt Used:      |                                  |                |                  |                    |                 |                   |               |
|             |               |                                  |                |                  |                    |                 |                   |               |
|             |               |                                  |                | Ar               | n-241              |                 |                   |               |
|             |               |                                  |                |                  |                    |                 |                   |               |
|             |               | Radion                           | uclide Identi  | fication         | Radio              | nuclide Identif | ication           |               |
|             |               |                                  | Vertical Plan  |                  |                    | Horizontal Pla  |                   |               |
|             |               | Position A                       | Position B     | Position C       | Position A         | Position B      | Position C        |               |
|             |               | 0                                | -45<br>Decree  | 45               | 0                  | -45             | 45                |               |
|             | ID 4          | Degree                           | Degree         | Degree           | Degree             | Degree          | Degree            |               |
|             | ID 1<br>ID 2  |                                  |                |                  |                    |                 |                   |               |
|             | ID 3          |                                  |                |                  |                    |                 |                   |               |
|             | ID 4          |                                  |                |                  |                    |                 |                   |               |
|             | ID 5          |                                  |                |                  |                    |                 |                   |               |
|             | ID 6          |                                  |                |                  |                    |                 |                   |               |
|             | ID 7          |                                  |                |                  |                    |                 |                   |               |
|             | ID 8          |                                  |                |                  |                    |                 |                   |               |
|             | ID 9<br>ID 10 |                                  |                |                  |                    |                 |                   |               |
| Numbo       | r Correct     |                                  |                |                  |                    |                 |                   | -             |
| Numbe       | Conect        |                                  |                |                  |                    |                 | 1                 | J             |
|             |               |                                  |                |                  |                    |                 |                   |               |
|             |               |                                  | Isotopes Ide   | ntified:         |                    |                 |                   |               |
|             |               | ۸.                               | Am-241         |                  |                    |                 |                   |               |
|             |               | A.                               | AIII-24 I      |                  |                    |                 |                   |               |
|             |               | B:<br>C:                         | AIII-24 I      |                  |                    |                 |                   |               |



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|        |  |            |                         | •           | o-60             |                  |            |
|--------|--|------------|-------------------------|-------------|------------------|------------------|------------|
|        |  |            |                         | <u>U</u>    | <u>u-uu</u>      |                  |            |
|        |  | Radion     | uclide Identi           |             | Radio            | nuclide Identifi | cation     |
|        |  |            | Vertical Plan           | ie          |                  | Horizontal Plai  | ne         |
|        |  | Position A | Position B              | Position C  | Position A       | Position B       | Position C |
|        |  | 0          | -45                     | 45          | 0                | -45              | 45         |
|        |  | Degree     | Degree                  | Degree      | Degree           | Degree           | Degree     |
|        | ID 1                                   |            |                         |             |                  |                  |            |
|        | ID 2                                   |            |                         |             |                  |                  |            |
|        | ID 3                                   |            |                         |             |                  |                  |            |
|        | ID 4                                   |            |                         |             |                  |                  |            |
|        | ID 5                                   |            |                         |             |                  |                  |            |
|        | ID 6                                   |            |                         |             |                  |                  |            |
|        | ID 7                                   |            |                         |             |                  |                  |            |
|        | ID 9                                   |            |                         |             |                  |                  |            |
|        | ID 10                                  |            |                         |             |                  |                  |            |
| Number | Correct                                |            |                         |             |                  |                  |            |
|        |  |            | 14                      | . 4: £: l . |                  |                  |            |
|        |  | ۸.         | Co-60                   | <u> </u>    |                  |                  |            |
|        |  | B:         | CO-00                   |             |                  |                  |            |
|        |  | C:         |                         |             |                  |                  |            |
|        |  | 0.         |                         |             |                  |                  |            |
|        |  |            |                         | Cs          | ÷137             |                  |            |
|        |  |            |                         | <u> </u>    | <del>, 101</del> |                  |            |
|        |  | Radion     | uclide Identi           | ication     | Radio            | nuclide Identifi | cation     |
|        |  |            | Vertical Plan           |             |                  | Horizontal Plai  |            |
|        |  | Position A | Position B              | Position C  | Position A       | Position B       | Position C |
|        |  | 0          | -45                     | 45          | 0                | -45              | 45         |
|        |  | Degree     | Degree                  | Degree      | Degree           | Degree           | Degree     |
|        | ID 1                                   | <u> </u>   | J                       |             |                  |                  |            |
|        | ID 2                                   |            |                         |             |                  |                  |            |
|        | ID 3                                   |            |                         |             |                  |                  |            |
|        | ID 4                                   |            |                         |             |                  | 11               |            |
|        |  |            |                         |             |                  |                  |            |
|        | ID 5                                   |            |                         |             |                  |                  |            |
|        |  |            |                         |             |                  |                  |            |
|        | ID 5<br>ID 6<br>ID 7                   |            |                         |             |                  |                  |            |
|        | ID 5<br>ID 6<br>ID 7<br>ID 8           |            |                         |             |                  |                  |            |
|        | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   |            |                         |             |                  |                  |            |
|        | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   |            |                         |             |                  |                  |            |
| Number | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   |            |                         |             |                  |                  |            |
| Number | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   |            |                         |             |                  |                  |            |
| Number | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   |            | Isotopes Idea           | ntified:    |                  |                  |            |
| Number | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   |            | Isotopes Idea<br>Cs-137 | ntified:    |                  |                  |            |
| Number | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   | B:         | Isotopes Idea<br>Cs-137 | ntified:    |                  |                  |            |
| Number | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   |            | Isotopes Idea<br>Cs-137 | ntified:    |                  |                  |            |
| Number | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   | B:         | Isotopes Idea<br>Cs-137 | ntified:    |                  |                  |            |
|        | ID 5 ID 6 ID 7 ID 8 ID 9 ID 10 Correct | B:         | Isotopes Idea<br>Cs-137 | ntified:    |                  |                  |            |
|        | ID 5<br>ID 6<br>ID 7<br>ID 8<br>ID 9   | B:         | Isotopes Idea<br>Cs-137 | ntified:    |                  |                  |            |
|        | ID 5 ID 6 ID 7 ID 8 ID 9 ID 10 Correct | B:         | Isotopes Idea<br>Cs-137 | ntified:    |                  |                  |            |
|        | ID 5 ID 6 ID 7 ID 8 ID 9 ID 10 Correct | B:         | Isotopes Idea<br>Cs-137 | ntified:    |                  |                  |            |
| Com    | ID 5 ID 6 ID 7 ID 8 ID 9 ID 10 Correct | B:         | Isotopes Idea<br>Cs-137 | ntified:    |                  | Detc             |            |
|        | ID 5 ID 6 ID 7 ID 8 ID 9 ID 10 Correct | B:         | Isotopes Idea<br>Cs-137 | ntified:    |                  | Date:            |            |
| Com    | ID 5 ID 6 ID 7 ID 8 ID 9 ID 10 Correct | B:         | Isotopes Idea<br>Cs-137 | ntified:    |                  | Date:            |            |



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|                  | Sectio       | n 6.13 <b>N</b> eı                 | utron R       | esponse         |               |           |       |
|------------------|--------------|------------------------------------|---------------|-----------------|---------------|-----------|-------|
|                  | Т            | est Data a                         | and Rec       | ort             |               |           |       |
| Manufacturer:    |              |                                    |               |                 |               |           |       |
| Model:           |              |                                    | Se            | rial Number:    |               |           |       |
| Requirement:     | in count rat | nent shall indicate, no further te | sting other t | than that state | d in 6.4.3 is | required. |       |
|                  |              | ge and within ±                    |               |                 |               |           |       |
| Note:            |              | are required widoes not apply,     |               |                 |               |           |       |
| Ambient C        | conditions:  |                                    | °C            |                 | %RH           |           | in HG |
| Test Equipn      | nent Used:   |                                    |               |                 |               |           |       |
| Manufacturer     | stated ma    | ximum respo                        | nse range:    |                 | mrem/h        |           |       |
| Source Data:     |              |                                    |               |                 |               |           |       |
|                  |              |                                    |               |                 |               |           |       |
|                  |              |                                    |               | ment Results    |               |           |       |
|                  |              | nax range                          |               | nax range       |               | nax range |       |
|                  |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| Acceptance Range | 0 -          | 0                                  | 0 -           | 0               | 0 -           | 0         |       |
|                  |              |                                    |               |                 |               |           |       |
| 1                |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| 2                |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| 3                |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| 4                |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| 5                |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| 6                |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| 7                |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| 8                |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| 9                |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| 10               |              | mrem/h                             |               | mrem/h          |               | mrem/h    |       |
| Mean             | #DIV/0!      | mrem/h                             | #DIV/0!       | mrem/h          | #DIV/0!       | mrem/h    |       |
|                  |              |                                    |               |                 |               |           |       |
| Comments:        |              |                                    |               |                 |               |           |       |
|                  |              |                                    |               |                 |               |           |       |
|                  |              |                                    |               |                 |               |           |       |
|                  |              |                                    |               |                 |               |           |       |
| Dantannaadtii    |              |                                    |               |                 |               |           |       |
| Performed by:    |              |                                    |               |                 | Date:         |           |       |
|                  |              |                                    |               |                 | _             |           |       |
| Reviewed by:     |              |                                    |               |                 | Date:         |           |       |



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|        | Section 6.  | 14 Over-F      | Range Cha        | aracteris     | tics for Id                 | entification                  | on                |        |
|--------|---|----------------|------------------|---------------|-----------------------------|-------------------------------|-------------------|--------|
|        |   |                | est Data         |               |                             |                               |                   |        |
|        | Manufacturer:   |                |                  | •             |                             |                               |                   |        |
|        | Model:  |                |                  | Se            | rial Number:                |                               |                   |        |
|        |   |                |                  |               |                             |                               |                   |        |
|        | Requirement:  | The manufactu  | irer shall state | the maximum   | exposure rate               | (relative to <sup>137</sup> C | cs) for identific | ation. |
|        |   |                |                  |               |                             |                               |                   |        |
|        | N   | 0              |                  | 41a a         |                             |                               |                   |        |
|        | Note:   | Comments are   | required when    | the requireme | ent is not verifie          | ea.                           |                   |        |
|        |   |                |                  |               |                             |                               |                   |        |
| ۸mh    | ient Conditions:  |                | °C               |               | %RH                         |                               | in HG             |        |
| AIIID  | nent conditions.  |                | C                |               | 701 KI I                    |                               | 11110             |        |
| Test E | quipment Used:  |                |                  |               |                             |                               |                   |        |
|        |   |                |                  |               |                             |                               |                   |        |
|        | Source Data:  |                |                  |               |                             |                               |                   |        |
|        |   |                |                  |               |                             |                               |                   |        |
| Ма     | nufacturer state  | d maximum e    | xposure rate:    |               | mR/h                        |                               |                   |        |
|        |   |                |                  |               |                             |                               |                   |        |
|        |   |                | Measurem         | ent Results   |                             |                               |                   |        |
|        |   |                |                  |               |                             |                               |                   |        |
|        | Evnequire ref   | a during tagt. |                  | mR/h          |                             |                               |                   |        |
|        | Exposure rat  | e during test: |                  | IIIIVII       |                             |                               |                   |        |
|        |   | ID Cs-137      |                  |               |                             |                               |                   |        |
|        | 1   |                |                  |               |                             |                               |                   |        |
|        |   |                |                  |               |                             | Yes                           | No                |        |
|        | 2   |                |                  |               |                             |                               | 140               |        |
|        | 2   |                |                  |               |                             |                               |                   |        |
|        | 3   |                |                  |               | rument provide              |                               |                   |        |
|        | 3<br>4  |                |                  | indication    | that exposure               | 100                           |                   |        |
|        | 3<br>4<br>5   |                |                  | indication    |                             |                               |                   |        |
|        | 3<br>4<br>5<br>6  |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7                                   |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8                              |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8<br>9                         |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8<br>9                         |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8<br>9                         |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>Number Correct |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8<br>9                         |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>Number Correct |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>Number Correct |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>Number Correct |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3 4 5 6 7 8 9 10 Number Correct  Comments:              |                |                  | indication    | that exposure was too high? |                               |                   |        |
|        | 3<br>4<br>5<br>6<br>7<br>8<br>9<br>10<br>Number Correct |                |                  | indication    | that exposure               |                               |                   |        |
|        | 3 4 5 6 7 8 9 10 Number Correct  Comments:              |                |                  | indication    | that exposure was too high? |                               |                   |        |
|        | 3 4 5 6 7 8 9 10 Number Correct  Comments:              |                |                  | indication    | that exposure was too high? |                               |                   |        |



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|               |                                       | Section  | on 6.15 Eff  | iciency   |                                       |  |                            |
|---------------|---------------------------------------|--|--|---|---------------------------------------|--|----------------------------|
|               |                                       | Test   | Data and   | Report  |                                       |  |                            |
| Manufacturer: |                                       |  |  |   |                                       |  |                            |
| Model         |                                       |  |  | Ser   | ial Number:                           |  |                            |
| Requirement   | = 272 d), 13<br>and 60Co (<br>NOTE—Da | 33Ba (356 ke\<br>1173 and 1332<br>ta from Evalua<br>Laboratoire Na | / at 62.05%, T1<br>2 keV at 99.857<br>ated Nuclear Str | rgy-peak efficienc<br>1/2 = 10.5 y), 137<br>1/8 and 99.983%,<br>ructure Data File<br>acquerel/Commiss | Cs (662 keV respectively, (ENSDF) and | at 85.1%, T1/2<br>T1/2 = 5.27 y<br>Bureau Nation | 2 = 30 y),<br>).<br>nal de |
| Notes         | Comments                              | are required v   | when the require                                       | ement is not verifi   | ed.                                   |  |                            |
| Ambient       | Conditions:                           |  | °C   |   | %RH                                   |  | in HG                      |
| Test Equip    | ment Used:                            |  |  |   |                                       |  |                            |
|               |                                       |  |  |   |                                       |  | I .                        |



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|     |                       |              |   | Efficiency Res              | ults                                 |                    |            |
|-----|-----------------------|--------------|---|-----------------------------|--------------------------------------|--------------------|------------|
|     |                       |              |   |                             |                                      |                    |            |
|     |                       |              | Source                                  | Measured<br>Efficiency      | Manufacturer<br>Stated<br>Efficiency |                    |            |
|     |                       |              | <sup>57</sup> Co                        |                             |                                      |                    |            |
|     |                       |              | <sup>60</sup> Co, Pk1                   |                             |                                      |                    |            |
|     |                       |              | <sup>60</sup> Co, Pk2                   |                             |                                      |                    |            |
|     |                       |              | <sup>133</sup> Ba                       |                             |                                      |                    |            |
|     |                       |              | <sup>137</sup> Cs                       |                             |                                      |                    |            |
|     |                       |              |   |                             |                                      |                    |            |
|     |                       |              | Test Measur                             | ements (Peak                | Efficiency)                          |                    |            |
|     |                       |              |   |                             |                                      |                    |            |
|     | I                     |              |   | ak dps comput               | ations                               |                    |            |
|     | Source                | ID           | Decayed<br>activity to<br>date<br>(uCi) | Decayed<br>Activity<br>(Bq) | Abundance<br>(Abd)                   | Peak<br>(gammas/s) |            |
|     | <sup>57</sup> Co      |              |   | #VALUE!                     | 0.8551                               | #VALUE!            |            |
|     | <sup>60</sup> Co, Pk1 |              |   | #VALUE!                     | 0.99857                              | #VALUE!            |            |
|     | <sup>60</sup> Co, Pk2 |              |   | #VALUE!                     | 0.99983                              | #VALUE!            |            |
|     | <sup>133</sup> Ba     |              |   | #VALUE!                     | 0.6205                               | #VALUE!            |            |
|     | <sup>137</sup> Cs     |              |   | #VALUE!                     | 0.851                                | #VALUE!            |            |
|     |                       |              |   |                             |                                      |                    |            |
|     |                       | 7            | Table 2. Net P                          | eak cps comp                | utations                             |                    |            |
|     |                       | Gross        |   | Net Peak                    |                                      | Net Peak           | Measured   |
|     | Source                | Peak<br>Area | Peak Bkg                                | Area                        | Acquisition time seconds             | Count<br>Rate      | efficiency |
|     | <sup>57</sup> Co      |              |   | #VALUE!                     |                                      | #VALUE!            | #VALUE!    |
|     | <sup>60</sup> Co, Pk1 |              |   | #VALUE!                     |                                      | #VALUE!            | #VALUE!    |
|     | <sup>60</sup> Co, Pk2 |              |   | #VALUE!                     |                                      | #VALUE!            | #VALUE!    |
|     | <sup>133</sup> Ba     |              |   | #VALUE!                     |                                      | #VALUE!            | #VALUE!    |
|     | <sup>137</sup> Cs     |              |   | #VALUE!                     |                                      | #VALUE!            | #VALUE!    |
|     |                       |              |   |                             |                                      |                    |            |
| С   | omments:              |              |   |                             |                                      |                    |            |
|     |                       |              |   |                             |                                      |                    |            |
|     |                       |              |   |                             |                                      |                    |            |
|     |                       |              |   |                             |                                      |                    |            |
|     |                       |              |   |                             |                                      |                    |            |
| Com | pleted by:            |              |   |                             |                                      | Date:              |            |
|     |                       |              |   |                             |                                      |                    |            |
| Rev | iewed by:             |              |   |                             |                                      | Date:              |            |
|     |                       |              |   |                             |                                      |                    |            |



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|       |           | Section 6.                      | 16 E\\                            | /idth Half                  | Mavimi              | ım             |               |        |
|-------|-----------|---------------------------------|-----------------------------------|-----------------------------|---------------------|----------------|---------------|--------|
|       | •         |                                 |                                   |                             |                     | 4111           |               |        |
|       |           | 1 (                             | esi Dala                          | and Repo                    | '1 L                |                |               |        |
| Manu  | facturer: |                                 |                                   |                             |                     |                |               |        |
|       | Model:    |                                 |                                   | Seri                        | al Number:          |                |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
| Requ  | irement:  | The manufacture detector used f | rer shall state<br>for 137Cs (662 | the FWHM as<br>keV at 85.1% | defined in tl<br>). | ne IEEE standa | ard appropria | ate to |
|       | Notes:    | Comments are                    | required wher                     | n the requireme             | ent is not ver      | ified.         |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
|       | Ambien    | t Conditions:                   |                                   | °C                          |                     | %RH            | iı            | n HG   |
| -     | Test Equi | pment Used:                     |                                   |                             |                     |                |               |        |
|       | ce Data:  |                                 |                                   |                             |                     |                |               |        |
| Jour  | ce Data.  |                                 |                                   |                             |                     |                |               |        |
|       |           | Full Wid                        | dth Half Max                      | imum Measui                 | ements              |                |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
|       |           | Manufacture                     |                                   |                             |                     | ed value       |               |        |
|       |           | FWHM Cs-                        | 137 (keV)                         |                             | FWHM C              | s-137 (keV)    |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
|       |           | Acceptance R<br>on Manufactur   |                                   |                             |                     |                |               |        |
|       |           | 0.00                            | 0.00                              |                             |                     |                |               |        |
|       |           | - 20 %                          | + 20 %                            |                             |                     |                |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
| Co    | mments:   |                                 |                                   |                             |                     |                |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
|       |           |                                 |                                   |                             |                     |                |               |        |
| Compl | eted by:  |                                 |                                   |                             |                     | Date:          |               |        |
|       | J         |                                 |                                   |                             |                     |                |               |        |
|       | wed by:   |                                 |                                   |                             |                     | Date:          |               |        |



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| Section 6.17 C        | over-Range                      | e Characteris                               | stics for                 | Exposi                | ure Rate       | Indication         |         |
|-----------------------|---------------------------------|---|---------------------------|-----------------------|----------------|--------------------|---------|
|                       |                                 | Test Data ar                                | nd Repo                   | rt                    |                |                    |         |
| Manufacturer:         |                                 |   |                           |                       |                |                    |         |
| Manufacturer.  Model: |                                 |   | Seria                     | al Number:            |                |                    |         |
|                       |                                 |   |                           |                       |                |                    |         |
| Requirement:          | The instrument greater than the | shall indicate that a<br>manufacturer-state | n over-range<br>d maximum | condition exposure ra | xists when the | e ambient exposure | rate is |
| Note:                 | Comments are                    | required when the re                        | equirement is             | not verified          |                |                    |         |
| Ambient Conditions:   |                                 | °C  |                           | %RH                   |                | in HG              |         |
| Test Equipment Used:  |                                 |   |                           |                       |                |                    |         |
| Source Data:          |                                 |   |                           |                       |                |                    |         |
|                       |                                 | Measuremen                                  | t Results                 |                       |                |                    |         |
|                       |                                 | - INGGGGI GITIGI                            | <u> </u>                  |                       |                |                    |         |
| Manufacturer'         | s Stated Maxim                  | um Exposure Rate:                           |                           |                       | mR/h           |                    |         |
|                       | Over-Range To                   | est Exposure Rate:                          |                           |                       | mR/h           |                    |         |
| Indicati              | on of Over-Rang                 | e within 5 seconds:                         |                           |                       |                |                    |         |
|                       | Over-Range                      | Exposure Duration:                          |                           |                       | min.           |                    |         |
|                       |                                 | Recovery Time:                              |                           |                       | min.           |                    |         |
| Comments:             |                                 |   |                           |                       |                |                    |         |
| Commonts.             |                                 |   |                           |                       |                |                    |         |
|                       |                                 |   |                           |                       |                |                    |         |
|                       |                                 |   |                           |                       |                |                    |         |
| Performed by:         |                                 |   |                           | Date:                 |                |                    |         |
|                       |                                 |   |                           | _                     |                |                    |         |
| Reviewed by:          |                                 |   |                           | Date:                 |                |                    |         |



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|               |   | Test                            | Data and R                           | eport              |                |                      |       |  |  |  |  |  |  |  |
|---------------|---|---------------------------------|--------------------------------------|--------------------|----------------|----------------------|-------|--|--|--|--|--|--|--|
|               |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
| Manufacturer: |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
| Model:        |   |                                 | Ser                                  | rial Number:       |                |                      |       |  |  |  |  |  |  |  |
| Requirement:  | The neutron indi manufacturer-st  | cation shall be<br>ated maximum | insensitive to gam<br>gamma exposure | ma radiation rate. | at gamma expos | sure rates up to the |       |  |  |  |  |  |  |  |
|               | The instrument shall indicate the presence of neutron radiation in the presence of gamma radiation. |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
| Note:         | Comments are  | reauired when t                 | he requirement is i                  | not verified.      |                |                      |       |  |  |  |  |  |  |  |
|               |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
| Ambi          | ent Conditions:   |                                 | °C                                   |                    | %RH            |                      | in HG |  |  |  |  |  |  |  |
|               |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
| Test Eq       | uipment Used:   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
| Gamm          | a Source Data:  |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
| Neutro        | n Source Data:  |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
|               |   | Mea                             | asurement Res                        | ults               |                |                      |       |  |  |  |  |  |  |  |
|               |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
|               |   | Applied gam                     | ma exposure rate:                    |                    | 1              |                      |       |  |  |  |  |  |  |  |
|               |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
|               | Neutr   | on response wi                  | thout neutron field                  |                    | 1              |                      |       |  |  |  |  |  |  |  |
|               | Ne  | eutron response                 | with neutron field                   |                    |                |                      |       |  |  |  |  |  |  |  |
| Commonte      |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
| Comments:     |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
|               |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
|               |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |
| erformed by:  |   |                                 |                                      | Date:              |                |                      |       |  |  |  |  |  |  |  |
| enomieu by:   |   |                                 |                                      | Date:              |                |                      |       |  |  |  |  |  |  |  |
|               |   |                                 |                                      |                    |                |                      |       |  |  |  |  |  |  |  |



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|                         |              |               | Test Da          | ta and R        | eport       |             |  |         |            |
|-------------------------|--------------|---------------|------------------|-----------------|-------------|-------------|--|---------|------------|
|                         |              |               |                  |                 |             |             |  |         |            |
| Manufacturer:<br>Model: |              |               |                  |                 | Cor         | ial Number  |  |         |            |
| woder:                  |              |               |                  |                 | Seri        | iai Number  |  |         |            |
| Requirement:            | The instrume | nt shall be o | perational at    | temperatures    | from -20 °C | to +50 °C.  |  |         |            |
| •                       |              |               |                  |                 |             |             |  |         |            |
| Note:                   | Comments a   | re required w | when the requ    | irement is no   | t verified  |             |  |         |            |
| Note.                   | OOMMONG CI   | re required v | viicii tiic icqu | iciliciti is no | Vornicu.    |             |  |         |            |
| Test Equip              | oment Used:  |               |                  |                 |             |             |  |         |            |
| Gamma S                 | ource Data:  |               |                  |                 |             |             |  |         |            |
|                         |              |               |                  |                 |             |             |  |         |            |
| Neutron S               | ource Data:  |               |                  |                 |             |             |  |         |            |
|                         |              |               | Gamma Ex         | posure Rate     | Measureme   | ent Results |  |         |            |
|                         | 22° C        | 30° C         | 40° C            | 50° C           | 10° C       | 0° C        | -10° C                                       | -20° C  |            |
|                         | as read      | as read       | as read          | as read         | as read     | as read     | as read                                      | as read |            |
| 1                       |              |               |                  |                 |             |             |  |         | (add units |
| 2                       |              |               |                  |                 |             |             |  |         |            |
| 3                       |              |               |                  |                 |             |             |  |         |            |
| 4                       |              |               |                  |                 |             |             |  |         |            |
| 5                       |              |               |                  |                 |             |             |  |         |            |
| 6                       |              |               |                  |                 |             |             |  |         |            |
| 7                       |              |               |                  |                 |             |             |  |         |            |
| 8                       |              |               |                  |                 |             |             | <u>                                     </u> |         |            |
| 9                       |              |               |                  |                 |             |             |  |         |            |
| 10                      |              |               |                  |                 |             |             |  |         | <u> </u>   |
| Mean                    | #DIV/0!      | #DIV/0!       | #DIV/0!          | #DIV/0!         | #DIV/0!     | #DIV/0!     | #DIV/0!                                      | #DIV/0! |            |
| STD                     | #DIV/0!      | #DIV/0!       | #DIV/0!          | #DIV/0!         | #DIV/0!     | #DIV/0!     | #DIV/0!                                      | #DIV/0! |            |
| 001/0/                  | #DIV/0!      | #DIV/0!       | #DIV/0!          | #DIV/0!         | #DIV/0!     | #DIV/0!     | #DIV/0!                                      | #DIV/0! |            |
| COV%                    | Conf-Int (-) | #DIV/0!       | #DIV/0!          | #DIV/0!         | #DIV/0!     | #DIV/0!     | #DIV/0!                                      | #DIV/0! |            |
| COV%                    |              | #DIV/0!       | #DIV/0!          | #DIV/0!         | #DIV/0!     | #DIV/0!     | #DIV/0!                                      | #DIV/0! |            |
| COV%                    | Conf-Int (+) |               |                  |                 |             |             |  |         |            |
| COV%                    | Conf-Int (+) | <u>(± 1</u>   | 5%) Accepta      | nce Range:      | #DIV/0!     | to          | #DIV/0!                                      |         |            |



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|                        | -          |       | 1=         |               |              |       |        |        |  |
|------------------------|------------|-------|------------|---------------|--------------|-------|--------|--------|--|
|                        |            |       | Radionucli | de Identifica | tion Results |       |        |        |  |
|                        | 000 0      | 000.0 | 100.0      | 500.0         | 100.0        | 000   | 400.0  | 0000   |  |
|                        | 22° C      | 30° C | 40° C      | 50° C         | 10° C        | 0° C  | -10° C | -20° C |  |
| ID 1                   |            |       |            |               |              |       |        |        |  |
| ID 2                   |            |       |            |               |              |       |        |        |  |
| ID 3                   |            |       |            |               |              |       |        |        |  |
| ID 4                   |            |       |            |               |              |       |        |        |  |
| ID 5                   |            |       |            |               |              |       |        |        |  |
| ID 6                   |            |       |            |               |              |       |        |        |  |
| ID 7                   |            |       |            |               |              |       |        |        |  |
| ID 8                   |            |       |            |               |              |       |        |        |  |
| ID 9                   |            |       |            |               |              |       |        |        |  |
| ID 10                  |            |       |            |               |              |       |        |        |  |
| Number Correct         |            |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
| Neutron (Cf-252) cps   |            |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
| Did instrument alarm   |            |       |            |               |              |       |        |        |  |
| due to the temperature | Yes        |       |            |               |              |       |        |        |  |
| test alone?            |            |       |            |               |              |       |        |        |  |
| No source present      | No         |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
|                        | Comments:  |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
| Per                    | formed by: |       |            |               |              | Date: |        |        |  |
|                        |            |       |            |               |              |       |        |        |  |
| n.                     | viewed by: |       |            |               |              | Date: |        |        |  |



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|          |                    |            |          |             |           | Sec       |           | 7.2 T   |          |                 |          | IOCK            |                 |         |           |          |                |            |          |     |
|----------|--------------------|------------|----------|-------------|-----------|-----------|-----------|---------|----------|-----------------|----------|-----------------|-----------------|---------|-----------|----------|----------------|------------|----------|-----|
|          |                    |            |          |             |           |           | Tes       | t Dat   | a an     | d Re            | oort     |                 |                 |         |           |          |                |            |          |     |
| Manu     | facturer:          |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
|          | Model:             |            |          |             |           |           |           |         |          | Se              | erial Nu | ımber:          |                 |         |           |          |                |            |          |     |
| D        | irement:           | The inet   | rumant c | hall ha f   | illy func | rtional v | vithin or | na hour | of evno  | eura ta         | ranid ta | mnaratı         | ıra chai        | nae fro | m 22 °(   | to _20   | \°C _2         | n °C to ∶  | 22 °C    |     |
| Kequ     | irement:           | 22 °C to   | 50 °C. a | and 50 °C   | C to 22   | °C with   | each ch   | nange b | eina ma  | ide in le       | ss than  | 5 min.          | The ins         | trument | t shall p | rovide a | n indica       | ation if i | t is not |     |
|          |                    | fully fund |          |             |           |           |           | . 5.    |          |                 |          |                 |                 |         | ,         |          |                |            |          |     |
|          |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
|          |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
|          |                    | Note:      | Comme    | ents are r  | reauired  | when t    | ne reaui  | rement  | is not v | erified.        |          |                 |                 |         |           |          |                |            |          |     |
|          |                    | 110101     |          |             | 94404     |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
|          |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| Toot     | Equipme            | nt Hoods   |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 162      | Equipine           | ni osea.   |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          | -   |
| Gam      | ma Sour            | re Data:   |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| Ouiii    | ina ooan           | oc Data.   |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| Neut     | ron Sour           | ce Data:   |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
|          |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| ĺ        | 22° C              |            |          |             |           | 22 to     | -20° C    |         |          | - 20 to         | 22° C    |                 |                 | 22 to   | 50° C     |          |                | 50 to      | 22° C    |     |
|          |                    |            |          |             | 15        | 30        | 45        | 60      | 15       | 30              | 45       | 60              | 15              | 30      | 45        | 60       | 15             | 30         | 45       | 6   |
| 1        |                    | (add unit  | ts)      |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 2        |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 3        |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 5        |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 6        |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 7        |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 8        |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 9        |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 10       |                    |            |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
|          | #DIV/0!            |            |          |             | #####     | #####     | #####     | ######  | #####    | #####           |          | #####           | #####           | #####   | #####     |          | #####          |            | #####    | ### |
|          | #DIV/0!<br>#DIV/0! |            |          | STD<br>COV% | #####     | #####     | #####     | #####   | #####    | #####<br>###### | #####    | #####<br>###### | #####<br>###### | #####   | #####     | #####    | #####<br>##### | #####      | #####    | ### |
| . J ¥ /0 | יואוטוי!           |            | Cor      | nf-Int (-)  | #####     | #####     | #####     | #####   | #####    | #####           | #####    | #####           | #####           | #####   | #####     | #####    | #####          | #####      | #####    | ### |
| Noi      | minal Me           | an         |          | f-Int (+)   |           | #####     | #####     | ######  | ######   | ######          | ######   | ######          | #####           | #####   | #####     | #####    | #####          | #####      | #####    | ### |
|          | ptance R           |            |          | ` '         |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| )IV/0!   | to                 | #DIV/0!    |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| low      |                    | high       |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |
| 15%)     |                    | (+15%)     |          |             |           |           |           |         |          |                 |          |                 |                 |         |           |          |                |            |          |     |



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|              | 22°       | С     | 22 to      | -20° C    |          |           | - 20 to | 22° C    |       |    | 22 to | 50° C |       |          | 50 to | 22° C |   |
|--------------|-----------|-------|------------|-----------|----------|-----------|---------|----------|-------|----|-------|-------|-------|----------|-------|-------|---|
|              |           | 15    | 30         | 45        | 60       | 15        | 30      | 45       | 60    | 15 | 30    | 45    | 60    | 15       | 30    | 45    | ( |
|              | ID 1      |       |            |           |          | i e       |         |          |       |    |       |       |       |          |       |       | Г |
|              | ID 2      |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       |   |
|              | ID 3      |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       |   |
| Number       | Correct   |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       |   |
| Noutron (Cf. | 353\ ana  |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       |   |
| Neutron (Cf- | zoz) cps  |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       | H |
|              |           |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       | Н |
|              |           | ID Ac | ceptance   | Criteria: |          |           |         |          |       |    |       | A:    | Am-24 | 41, Co-6 | 0     |       |   |
|              |           |       | ct Radion  |           |          |           |         |          |       |    |       | B:    |       |          |       |       |   |
|              |           |       | erature sh |           |          |           |         |          |       | st |       | C:    |       |          |       |       |   |
|              |           |       | with the   | ID resul  | ts at an | nbient te | emperat | ure beir | g the |    |       | D:    |       |          |       |       |   |
|              |           | basel | ine.       |           |          |           |         |          |       |    |       |       |       |          |       |       |   |
|              |           |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       | L |
| Con          | nments:   |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       |   |
| 00.1         | illionto. |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       | H |
|              |           |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       | Т |
|              |           |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       |   |
|              |           |       |            |           |          |           |         |          |       |    |       |       |       |          |       |       | L |
| Perfori      | ned by:   | _     |            |           |          |           |         |          |       |    |       | Date: |       |          |       |       | H |
| Davida       | wed by:   |       |            |           |          |           |         |          |       |    |       | Date: |       |          |       |       | H |



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|              |            | Section         | on 7.3 Hur                   | nidity Tes         | st Results         | <b>3</b>    |             |          |
|--------------|------------|-----------------|------------------------------|--------------------|--------------------|-------------|-------------|----------|
|              |            |                 |                              | and Rep            |                    |             |             |          |
|              |            |                 |                              |                    |                    |             |             |          |
| Manu         | facturer:  |                 |                              |                    |                    |             |             |          |
|              | Model:     |                 |                              | Se                 | erial Number:      |             |             |          |
|              |            |                 |                              |                    |                    |             |             |          |
| Requirement: | The instru | ument shall be  | fully functional             | over the range     | of humidity fro    | m 40% to 9  | 3% relative | humidity |
|              | (RH) at 3  | 5 °C.           |                              |                    |                    |             |             |          |
|              |            |                 |                              |                    |                    |             |             |          |
| Note:        | Commen     | ts are required | when the requir              | rement is not w    | erified.           |             |             |          |
|              |            |                 |                              |                    |                    |             |             |          |
|              |            |                 |                              |                    |                    |             |             |          |
| Test Equipme | ent Used:  |                 |                              |                    |                    |             |             |          |
| Gamma Soul   | ce Data:   |                 |                              |                    |                    |             |             |          |
|              |            |                 |                              |                    |                    |             |             |          |
| Neutron Soul | ce Data:   |                 |                              |                    |                    |             |             |          |
|              |            |                 | Moa                          | surement Re        | culte              |             |             |          |
|              |            |                 | ivied                        | Surement Ne        | <u>suits</u>       |             |             |          |
|              |            |                 | Nominal                      |                    |                    |             |             |          |
|              |            |                 | 40% RH                       | 93% RH             | 40% RH             |             |             |          |
|              |            |                 | 22° C                        | 35° C              | 35° C              |             |             |          |
|              |            | 1               |                              |                    |                    | (add units) |             |          |
|              |            | 2               |                              |                    |                    |             |             |          |
|              |            | 3               |                              |                    |                    |             |             |          |
|              |            | 4               |                              |                    |                    |             |             |          |
|              |            | 5               |                              |                    |                    |             |             |          |
|              |            | 6               |                              |                    |                    |             |             |          |
|              |            | 7               |                              |                    |                    |             |             |          |
|              |            | 8               |                              |                    |                    |             |             |          |
|              |            | 9               |                              |                    |                    |             |             |          |
|              |            | 10              | #D1//01                      | #D1//01            | #D1\/\0\           |             |             |          |
|              |            | Mean            | #DIV/0!                      | #DIV/0!            | #DIV/0!            |             |             |          |
|              |            | STD             | #DIV/0!                      | #DIV/0!            | #DIV/0!            |             |             |          |
|              |            | COV%            |                              | #DIV/0!<br>#DIV/0! | #DIV/0!<br>#DIV/0! |             |             |          |
|              |            |                 | Conf-Int (-)<br>Conf-Int (+) |                    | #DIV/0!<br>#DIV/0! |             |             |          |
|              |            |                 | COIN-IIIL (+)                | יייייי:            | #DIV/U:            |             |             |          |
|              |            |                 | Ac                           | ceptance Ran       | nae                |             |             |          |
|              |            |                 | <u>- 10</u>                  |                    |                    |             |             |          |
|              |            |                 | #DIV/0!                      | to                 | #DIV/0!            |             |             |          |
|              |            |                 | low (-15%)                   |                    | high (+15%)        |             |             |          |
|              |            |                 |                              |                    |                    |             |             |          |



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|           |  | Radionuclio   | de Identifica                  | tion Results         |               |          |
|-----------|--|---|--------------------------------|----------------------|---------------|----------|
|           |  |   |                                |                      |               |          |
|           |  | 40%   | 93%                            | 40%                  |               |          |
|           |  | 22° C   | 35° C                          | 35° C                |               |          |
|           |  | Baseline  |                                |                      |               |          |
|           | ID 1   |   |                                |                      |               |          |
|           | ID 2   |   |                                |                      |               |          |
|           | ID 3   |   |                                |                      |               |          |
|           | ID 4   |   |                                |                      |               |          |
|           | ID 5   |   |                                |                      |               |          |
|           | ID 6   |   |                                |                      |               |          |
|           | ID 7   |   |                                |                      |               |          |
|           | ID 8   |   |                                |                      |               |          |
|           | ID 9   |   |                                |                      |               |          |
|           | ID 10  |   |                                |                      |               |          |
| Nu        | mber Correct   |   |                                |                      |               |          |
|           |  |   |                                |                      |               |          |
| Neutro    | on (Cf-252) cps  |   |                                |                      |               |          |
|           |  |   |                                |                      |               |          |
|           |  |   |                                |                      |               |          |
|           |  |   |                                |                      |               |          |
|           | ID Acceptance  | Criteria:   |                                |                      |               |          |
|           | ID Acceptance<br>Correct Radior  |   | s correct)                     |                      |               |          |
|           | Correct Radior   | nuclides ID: (A i   | s correct)                     | uclide ID results at | elevated      |          |
|           | Correct Radior<br>Humidity Pass  | nuclides ID: (A i<br>s/Fail: Comparis                     | on of Radionu                  | uclide ID results at |               | y/tempe  |
|           | Correct Radior<br>Humidity Pass  | nuclides ID: (A i<br>s/Fail: Comparis<br>eratures with th | on of Radionu                  |                      |               | y/tempe  |
|           | Correct Radior<br>Humidity Pass<br>humidity/temp   | nuclides ID: (A i<br>s/Fail: Comparis<br>eratures with th | on of Radionu                  |                      |               | y/tempe  |
|           | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base                         | nuclides ID: (A i<br>s/Fail: Comparis<br>eratures with th | on of Radionu<br>e Radionuclid |                      |               | y/tempe  |
|           | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base                         | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/temper |
|           | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:                   | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/temper |
|           | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:             | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/temper |
|           | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:<br>C:       | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/temper |
|           | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:<br>C:       | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/tempe  |
|           | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:<br>C:       | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/tempel |
| Comments: | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:<br>C:       | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/tempel |
| Comments: | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:<br>C:       | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/tempel |
| Comments: | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:<br>C:<br>D: | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/temper |
| Comments: | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:<br>C:<br>D: | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/temper |
|           | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:<br>C:<br>D: | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/temper |
| Comments: | Correct Radior<br>Humidity Pass<br>humidity/temp<br>being the base<br>A:<br>B:<br>C:<br>D: | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      |               | y/tempel |
|           | Correct Radior Humidity Pass humidity/temp being the base  A: B: C: D:                     | nuclides ID: (A is/Fail: Compariseratures with the line.  | on of Radionu<br>e Radionuclid |                      | bient humidit | y/tempel |



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|             | Sect               | ion 7.4 M          | oisture an       | d dust      | protection      | n            |              |               |
|-------------|--------------------|--------------------|------------------|-------------|-----------------|--------------|--------------|---------------|
|             |                    | Test               | t Data and       | l Repoi     | rt              |              |              |               |
|             |                    |                    |                  |             |                 |              |              |               |
| N           | lanufacturer:      |                    |                  |             |                 |              |              |               |
|             | Model:             |                    |                  | Se          | rial Number:    |              |              |               |
|             | )                  | The instrument     | t again degign a | hall most t | ho roquiromon   | to atatad fa | r ID aada 5  | 2 (000 IEC    |
| l           | requirement:       |                    | means that the   |             |                 |              |              |               |
|             |                    |                    | vater. For IP53  |             |                 |              |              |               |
|             |                    |                    | n a quantity to  |             |                 |              |              |               |
|             |                    | have no harmfu     | and water spray  | yed at an a | ingle up to 60° | on either s  | ide of the v | erticai snaii |
|             |                    | nave no namin      | ai Cilcoto.      |             |                 |              |              |               |
|             |                    |                    |                  |             |                 |              |              |               |
|             | Note:              | Comments are       | required when    | the require | ement is not ve | rified.      |              |               |
|             |                    |                    |                  |             |                 |              |              |               |
|             | Ambie              | nt Conditions:     |                  | °C          |                 | %RH          |              | in HG         |
|             |                    |                    |                  |             |                 |              |              |               |
|             | Test Equ           | ipment Used:       |                  |             |                 |              |              |               |
|             | Source Data:       |                    |                  |             |                 |              |              |               |
|             | Source Data:       |                    |                  |             |                 |              |              |               |
|             |                    |                    | Measure          | ment Resi   | ults - Dust     |              |              |               |
|             |                    |                    |                  |             |                 |              |              |               |
|             | Pre-Test           | Post-Test          |                  |             | Inspection R    | esults:      |              | 1             |
| 4           |                    |                    |                  |             |                 |              |              |               |
| 1<br>2      |                    |                    | (add units)      |             |                 |              |              |               |
| 3           |                    |                    |                  |             |                 |              |              |               |
| 4           |                    |                    |                  |             |                 |              |              |               |
| 5           |                    |                    |                  |             |                 |              |              |               |
| 6<br>7      |                    |                    |                  |             |                 |              |              |               |
| 8           |                    |                    |                  |             |                 |              |              |               |
| 9           |                    |                    |                  |             |                 |              |              |               |
| 10<br>Maan  | #DIV/0!            | #DIV/0!            |                  |             |                 |              |              |               |
| Mean<br>STD | #DIV/0!<br>#DIV/0! | #DIV/0!<br>#DIV/0! |                  |             |                 |              |              |               |
| cov%        | #DIV/0!            | #DIV/0!            |                  |             |                 |              |              |               |
|             | Conf-Int (-)       |                    |                  |             |                 |              |              |               |
|             | Conf-Int (+)       | #DIV/0!            |                  |             |                 |              |              |               |
|             |                    |                    | Acce             | ptance R    | ange            |              |              |               |
|             |                    |                    | Acce             | pane N      | ungo            |              |              |               |
|             |                    |                    | #DIV/0!          | to          | #DIV/0!         |              |              |               |
|             |                    |                    | low (-15%)       |             | high (+15%)     |              |              |               |
|             |                    |                    |                  |             |                 |              | Yes          | No            |
|             |                    | Di                 | d the instrume   | nt respond  | throughout the  | dust test?   |              | ···           |
|             |                    |                    |                  | ,           | ,               |              |              |               |
|             |                    |                    |                  |             |                 |              |              |               |



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|             |                    |                    | Measureme         | nt Resu   | Its - Moisture  |             |       |      |
|-------------|--------------------|--------------------|-------------------|-----------|-----------------|-------------|-------|------|
|             |                    |                    |                   |           | moroidio        |             |       |      |
|             | Pre-Test           | Post-Test          |                   |           | Inspection Re   | aulta.      |       |      |
|             | Pre-rest           | Post-Test          |                   |           | inspection Re   | esuits:     |       |      |
| 1           |                    |                    | (add units)       |           |                 |             |       |      |
| 2           |                    |                    | (aud units)       |           |                 |             |       |      |
| 3           |                    |                    |                   |           |                 |             |       |      |
| 4           |                    |                    |                   |           |                 |             |       |      |
| 5           |                    |                    |                   |           |                 |             |       |      |
| 6           |                    |                    |                   |           |                 |             |       |      |
| 7           |                    |                    |                   |           |                 |             |       |      |
| 8           |                    |                    |                   |           |                 |             |       |      |
| 9           |                    |                    |                   |           |                 |             |       |      |
| 10          |                    |                    |                   |           |                 |             |       |      |
|             | #DIV//01           | #DI\//01           |                   |           |                 |             |       |      |
| Mean<br>STD | #DIV/0!<br>#DIV/0! | #DIV/0!<br>#DIV/0! |                   |           |                 |             |       |      |
|             |                    |                    |                   |           |                 |             |       |      |
| ov%         | #DIV/0!            | #DIV/0!<br>#DIV/0! |                   |           |                 |             |       |      |
|             | Conf-Int (-)       |                    |                   |           |                 |             |       |      |
|             | Conf-Int (+)       | #DIV/0!            |                   |           |                 |             |       |      |
|             |                    |                    |                   |           | D =             |             |       |      |
|             |                    |                    | Acce              | ptance    | <u>kange</u>    |             |       |      |
|             |                    |                    | #DIV/0!           | to        | #DIV/0!         |             |       |      |
|             |                    |                    | low (-15%)        |           | high (+15%)     |             |       |      |
|             |                    |                    | (,                |           | g (,            |             |       |      |
|             |                    |                    |                   |           |                 |             | V     | Na   |
|             |                    |                    |                   |           |                 |             | ı Yes | NO I |
|             |                    | Did th             | ne instrument res | spond thr | oughout the moi | sture test? | Yes   | No   |
|             |                    | Did th             | ne instrument res | spond thr | oughout the moi | sture test? | Yes   | NO   |
|             |                    | Did ti             | ne instrument res | pond thr  | oughout the moi | sture test? | Yes   | NO   |
|             | Comments           | Did th             | ne instrument res | spond thr | oughout the moi | sture test? | Yes   | NO   |
|             | Comments           | Did ti             | ne instrument res | spond thr | oughout the moi | sture test? | Yes   | NO   |
|             | Comments           | Did th             | ne instrument res | spond thr | oughout the moi | sture test? | Yes   | NO   |
|             | Comments           | Did tl             | ne instrument res | spond thr | oughout the moi | sture test? | Yes   | NO   |
|             | Comments           | Did th             | ne instrument res | spond thr | oughout the moi | sture test? | Tes   | NO   |
|             | Comments           | Did th             | ne instrument res | spond thr | oughout the moi | sture test? | Yes   | NO   |
|             |                    | Did th             | ne instrument res | spond thr |                 | sture test? | Yes   | NO   |
| P           | Comments           | Did th             | ne instrument res | spond thr | oughout the moi | sture test? | Tes   | NO   |
|             |                    | Did th             | ne instrument res | spond thr |                 | sture test? | Tes   | NO   |



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|               | Section 7.      | 5 Cold Te                  | mperatu       | re Start U          | р           |  |
|---------------|-----------------|----------------------------|---------------|---------------------|-------------|--|
|               |                 | est Data a                 | _             |                     |             |  |
|               |                 |                            |               |                     |             |  |
| Manufacturer: |                 |                            |               |                     |             |  |
| Model:        |                 |                            | Se            | erial Number:       |             |  |
| Requirement:  | The instrumen   | t shall he ahle t          | o onerate whe | n switched on       | at the cold |  |
| Requirement.  | temperature lir |                            | o operate who | in switched on      | at the cold |  |
|               |                 | ,                          |               |                     |             |  |
| Note:         | Comments are    | required when              | the requireme | nt is not verifie   | d.          |  |
|               |                 |                            |               |                     |             |  |
| Toot Fau      | inmont Hood:    |                            |               |                     |             |  |
| iest ⊑qu      | ipment Used:    |                            |               |                     |             |  |
| Gamma         | Source Data:    |                            |               |                     |             |  |
|               |                 |                            |               |                     |             |  |
| Neutron       | Source Data:    |                            |               |                     |             |  |
|               |                 |                            |               |                     |             |  |
|               |                 |                            |               |                     |             |  |
|               |                 | Measureme                  | ent Results   |                     |             |  |
|               |                 | Nominal                    | - 20 °C       | 1                   |             |  |
|               |                 | Nominal                    | - 20 C        |                     |             |  |
|               | 1               |                            |               | (add units)         |             |  |
|               | 2               |                            |               | (ddd driits)        |             |  |
|               | 3               |                            |               |                     |             |  |
|               | 4               |                            |               |                     |             |  |
|               | 5               |                            |               |                     |             |  |
|               | 6               |                            |               |                     |             |  |
|               | 7               |                            |               |                     |             |  |
|               | 8               |                            |               | -                   |             |  |
|               | 9               | <b> </b>                   |               | -                   |             |  |
|               | Mean            | #DIV/0!                    | #DIV/0!       | 1                   |             |  |
|               | STD             |                            | #DIV/0!       |                     |             |  |
|               | COV%            |                            | #DIV/0!       | 1                   |             |  |
|               |                 | Conf-Int (-)               |               | <b>"</b>            |             |  |
|               |                 | Conf-Int (+)               |               |                     |             |  |
|               |                 |                            |               |                     |             |  |
|               |                 | Ac                         | cceptance Rar | <u>nge</u>          |             |  |
|               |                 | #DI\//01                   | to            | #DIV/01             |             |  |
|               |                 | # <b>DIV/0!</b><br>low 15% | to            | #DIV/0!<br>high 15% |             |  |
|               |                 | 10W 1370                   |               | Tilgit 1576         |             |  |
|               |                 |                            |               |                     |             |  |



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|               | Radio          | onuclide Ider | ntification Resu | Its   |           |                   |
|---------------|----------------|---------------|------------------|-------|-----------|-------------------|
|               |                |               |                  |       |           |                   |
|               |                | Nominal       | - 20 °C          |       |           |                   |
|               | ID 1           |               |                  |       | Definitio | ns of Radionuclid |
|               | ID 2           |               |                  |       |           | identified:       |
|               | ID 3           |               |                  |       | A:        | Am-241, Co-60     |
|               | ID 4           |               |                  |       | B:        |                   |
|               | ID 5           |               |                  |       | C:        |                   |
|               | ID 6           |               |                  |       | D:        |                   |
|               | ID 7           |               |                  |       |           |                   |
|               | ID 8           |               |                  |       |           |                   |
|               | ID 9           |               |                  |       |           |                   |
|               | ID 10          |               |                  |       |           |                   |
| Nı            | umber Correct  |               |                  |       |           |                   |
| Neutro        | n (Cf-252) cps |               |                  |       |           |                   |
| Comments:     |                |               |                  |       |           |                   |
|               |                |               |                  |       |           |                   |
| Performed by: |                |               |                  | Date: |           |                   |
| Reviewed by:  |                |               |                  | Date: |           |                   |



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|--|-----------------------------|------------------------|----------------------|
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|                                       | Se                          | ction 8.1                   | Electro      | static D     | ischar        | ge                                |          |               |           |
|---------------------------------------|-----------------------------|-----------------------------|--------------|--------------|---------------|-----------------------------------|----------|---------------|-----------|
|                                       |                             |                             |              | nd Rep       |               |                                   |          |               |           |
|                                       |                             |                             |              |              |               |                                   |          |               |           |
| Ма                                    | nufacturer:                 |                             |              |              |               |                                   |          |               |           |
|                                       | Model:                      |                             |              | Seria        | I Number:     |                                   |          |               |           |
| Re                                    | Requirement: The instrume   |                             |              |              |               |                                   |          |               |           |
|                                       |                             | contact elect               | rostatic dis | charges at i | ntensities o  | f up to 6 kV.                     |          |               |           |
|                                       | Note:                       | Comments a                  | re required  | when the red | guirement is  | s not                             |          |               |           |
|                                       |                             |                             |              |              | 1             |                                   |          |               |           |
|                                       | Ambient                     | Conditions:                 |              | °C           |               | % RH                              |          | in Hg         |           |
|                                       | 7 unbione                   |                             |              |              |               | 70 1 11 1                         |          | g             |           |
|                                       | Test Equip                  | ment Used:                  |              |              |               |                                   |          |               |           |
|                                       | Gamma S                     | ource Data:                 |              |              |               |                                   |          |               |           |
|                                       | Cumma C                     | ouroc Buta.                 |              |              |               |                                   |          |               |           |
|                                       | Neutron S                   | ource Data:                 |              |              |               |                                   |          |               |           |
|                                       |                             | Evn                         | ocuro and    | or Count R   | ata Pasnar    | 100                               |          |               |           |
|                                       |                             | LAP                         | osure ariu/  | Or Count IX  | ate Nespoi    | 130                               |          |               |           |
|                                       | Pre                         | Test                        |              |              |               | Post                              | Test     |               |           |
|                                       | Gamma                       | Neutron                     |              | Gamma        |               |                                   | Neutron  |               |           |
|                                       | (add units)                 | (add units)                 |              | 2 kV         | 4 kV          | 6 kV                              | 2 kV     | 4 kV          | 6 kV      |
| 1                                     |                             |                             | 1            |              |               |                                   |          |               |           |
| 2                                     |                             |                             | 2            |              |               |                                   |          |               |           |
| 4                                     |                             |                             | 4            |              |               |                                   |          |               |           |
| 5                                     |                             |                             | 5            |              |               |                                   |          |               |           |
| 6                                     |                             |                             | 6            |              |               |                                   |          |               |           |
| 7                                     |                             |                             | 7            |              |               |                                   |          |               |           |
| 8                                     |                             |                             |              |              |               |                                   |          |               |           |
|                                       |                             |                             | 8            |              |               |                                   |          |               |           |
| 9                                     |                             |                             | 9            |              |               |                                   |          |               |           |
| 9<br>10                               | #DI\ //01                   | #DIV/O                      |              | #DN//01      | #DIV//OI      | #DIV/O                            | #DI\//04 | #DI\(\(\rho\) | #DI\(\O\) |
| 9<br>10<br><b>Mean</b>                |                             | #DIV/0!                     | 9            | #DIV/0!      | #DIV/0!       | #DIV/0!                           | #DIV/0!  | #DIV/0!       | #DIV/0!   |
| 9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!                     | #DIV/0!                     | 9            | #DIV/0!      | #DIV/0!       | #DIV/0!                           | #DIV/0!  | #DIV/0!       | #DIV/0!   |
| 9<br>10<br><b>Mean</b>                | #DIV/0!                     | _                           | 9            | #DIV/0!      | #DIV/0!       | #DIV/0!                           | #DIV/0!  | #DIV/0!       | #DIV/0!   |
| 9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!                     | #DIV/0!<br>#DIV/0!          | 9            |              | #DIV/0!       | #DIV/0!                           | #DIV/0!  | #DIV/0!       | #DIV/0!   |
| 9<br>10<br><b>Mean</b><br>STD<br>COV% | #DIV/0!<br>#DIV/0!<br>Gamma | #DIV/0!<br>#DIV/0!<br>Accep | 9            | nge          | Neutron       |                                   | #DIV/0!  | #DIV/0!       | #DIV/0!   |
| 9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!<br>#DIV/0!          | #DIV/0!<br>#DIV/0!          | 9            |              | Neutron<br>to | #DIV/0!<br>#DIV/0!<br>high (+15%) | #DIV/0!  | #DIV/0!       | #DIV/0!   |



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|                             | Rad                       | ionuclide Id | lentificatio | n Test Resi | ults  |         |                   |
|-----------------------------|---------------------------|--------------|--------------|-------------|-------|---------|-------------------|
|                             |                           |              |              |             |       | Radionu | clides Identified |
|                             |                           | Pre Test     | 2 kV         | 4 kV        | 6 kV  |         |                   |
|                             |                           |              |              |             |       | A       | Am-241, Co-60     |
|                             | ID 1                      |              |              |             |       | В       |                   |
|                             |                           |              |              |             |       | С       |                   |
|                             | ment alarm<br>he ESD test | Yes          |              |             |       |         |                   |
| alone?<br>No source present |                           | No           |              |             |       |         |                   |
|                             |                           |              |              |             |       |         |                   |
|                             | Comments:                 |              |              |             |       |         |                   |
|                             |                           |              |              |             |       |         |                   |
| Pe                          | rformed by:               |              |              |             | Date: |         |                   |
|                             | eviewed by:               |              |              |             | Date: |         |                   |



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| Test Data and Report  Manufacturer:  Model:  Serial Number:  Requirement: The instrument should not be affected by RF fields over the frequency range of 80 MHz |      |
|---|------|
| Model: Serial Number:   |      |
|   |      |
| Paguirement: The instrument should not be affected by RF fields over the frequency range of 90 MH:  |      |
| Paguirement: The instrument should not be affected by RF fields over the frequency range of 90 MH:  |      |
|   | z to |
| 2500 MHz at an intensity of 10 volts per meter (V/m).   | . 10 |
| 2000 Will 2 dt dif interiorty of 10 voite per meter (v/m).  |      |
|   |      |
| Note: Comments are required when the requirement is not verified.   |      |
|   |      |
| Ambient Conditions: °C %RH In. Hg   |      |
|   |      |
| Test Equipment Used:  |      |
|   |      |
| Frequency Scan Observations Without Sources   |      |
|   |      |
|   |      |
|   |      |
|   |      |
|   |      |
|   |      |
|   |      |
|   |      |
|   |      |
|   |      |
|   |      |
|   |      |
| Were susceptibilities observed?   |      |
| Yes No  |      |
| 100   |      |
|   |      |



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|        |               |             | With Cs-137 and | Cf-252 Sources    | <b>.</b>      |             |   |
|--------|---------------|-------------|-----------------|-------------------|---------------|-------------|---|
|        | Nominal       |             |                 |                   |               |             |   |
|        | No RF         |             | Gamm            | a Source Data:    |               |             |   |
|        | Gamma         |             |                 |                   |               |             |   |
| 1      |               | (add units) | Neutro          | n Source Data:    |               |             |   |
| 2      |               |             |                 |                   |               |             |   |
| 3      |               |             |                 |                   |               |             |   |
| 4      |               |             | Accepta         | nce Range (Gar    | mma)          |             |   |
| 5      |               |             | #DIV/0!         | to                | #DIV/0!       |             |   |
| 6      |               |             | low (-15%)      |                   | high (+15%)   |             |   |
| 7      |               |             |                 |                   |               |             |   |
| 8      |               |             |                 | nce Range (Νει    |               |             |   |
| 9      |               |             | #DIV/0!         | to                | #DIV/0!       |             |   |
| 10     |               |             | low (-15%)      |                   | high (+15%)   |             |   |
| Mean   |               |             |                 |                   |               |             |   |
| STD    |               |             |                 |                   |               |             |   |
| COV%   | #DIV/0!       |             |                 |                   |               |             |   |
|        |               |             | Fre             | quency Scan O     | bservations w | ith Sources | i |
|        |               |             |                 |                   |               |             |   |
|        | Nominal       |             |                 |                   |               |             |   |
|        | No RF         |             |                 |                   |               |             |   |
|        | Neutron       |             |                 |                   |               |             |   |
| 1      |               | (add units) |                 |                   |               |             |   |
| 2      |               |             |                 |                   |               |             |   |
|        |               |             |                 |                   |               |             |   |
| 4      |               |             |                 |                   |               |             |   |
| 5      |               |             |                 |                   |               |             |   |
| 6      |               |             |                 |                   |               |             |   |
| 7      |               |             |                 |                   |               |             |   |
| 8<br>9 |               |             |                 |                   |               |             |   |
| 10     |               |             |                 |                   |               |             |   |
|        |               |             |                 |                   |               |             |   |
| Mean   |               |             |                 |                   |               |             |   |
| STD    |               |             | <b>NA</b> /     |                   |               |             |   |
| COV%   | #DIV/0!       |             | T               | e susceptibilitie |               |             |   |
|        |               |             | Yes             |                   | No            |             |   |
|        |               |             |                 |                   |               |             |   |
|        |               |             |                 |                   |               |             |   |
|        | Comments:     |             |                 |                   |               |             |   |
|        |               |             |                 |                   |               |             |   |
|        |               |             | 1               |                   |               |             |   |
|        |               |             |                 |                   |               |             |   |
|        |               |             |                 |                   |               |             |   |
| ,      | Completed by: |             |                 |                   | Date:         |             |   |
| (      | Completed by: |             |                 |                   | Date:         |             |   |
|        | Reviewed by:  |             |                 |                   | Date:         |             |   |
|        | Noviewed by.  |             |                 |                   | Date.         |             |   |
|        |               |             |                 |                   |               |             |   |



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|             |                |   | nissions  |  |   |
|-------------|----------------|---|---|--|---|
|             | Test Da        | ta and Rep  | ort   |  |   |
|             |                |   |   |  |   |
|             |                | Ser   | ial Number:   |  |   |
| The emissio | n limits wher  | measured at thr   | ree meters fro  | m the instrum  | ent shall be  |
|             |                |   |   |  |   |
|             |                |   | Field   | Strength   |   |
|             |                |   |   |  |   |
|             |                |   |   |  |   |
|             |                |   |   |  |   |
|             |                |   |   |  |   |
|             |                |   |   |  |   |
|             | Abo            | ove 960   |   | 500  |   |
| Comments a  | are required v | uhen the requiren   | nent is not ver   | rified.  |   |
|             |                |   |   |  |   |
|             | °C             |   | %RH   |  | in HG   |
|             |                |   |   |  |   |
|             |                |   |   |  |   |
| 147         | <u> </u>       | 41 11 14 0  | Yes   | No   |   |
| Were e      | emissions at   | oove the limits?  |   |  |   |
|             |                |   |   |  |   |
|             |                |   |   |  |   |
|             |                |   |   |  |   |
|             |                |   |   |  |   |
|             |                |   |   |  |   |
|             |                |   | Date:   |  |   |
|             | Comments a     | The emission limits wher less than what is shown  Emission R  ()  30  88  210  Abo  Comments are required v | The emission limits when measured at thr less than what is shown below:  Emission Frequency Range (MHz) 30 – 88 88 – 216 216 – 960 Above 960  Comments are required when the requiren | less than what is shown below:    Emission Frequency Range | Serial Number:  The emission limits when measured at three meters from the instrum less than what is shown below:  Emission Frequency Range (MHz) (micro volts/meter)  30 – 88 100  88 – 216 150  216 – 960 200  Above 960 500  Comments are required when the requirement is not verified. |



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|                     | Section                 | n 8.4 Condu          | icted Immi        | unity         |               |              |
|---------------------|-------------------------|----------------------|-------------------|---------------|---------------|--------------|
|                     |                         | Γest Data an         |                   | unity         |               |              |
| Manufacturer:       |                         | l est Data all       | id ixeport        |               |               |              |
| Manuacturer. Model: |                         |                      | Se                | rial Number:  |               | <u> </u>     |
| model.              |                         |                      | 06                | nai Number.   |               |              |
| Requirement:        | The instrument          | t should not be affe | cted by RF field  | s that can be | conducted o   | nto the      |
|                     | instrument thro         | ough an external co  | onducting cable.  | Instruments t | that do not h | ave at least |
|                     | one external c          | onducting cable for  | routine operation | n are exclude | d.            |              |
|                     |                         |                      |                   |               |               |              |
| Note:               | Comments are            | required when the    | requirement is    | not verified. |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         | -                    |                   | .,            |               | <u> </u>     |
| Ambient Conditions: |                         | °C                   |                   | %RH           |               | In. Hg       |
| To at Fau           | in man a met I lans als |                      |                   |               |               |              |
| i est Equ           | ipment Used:            |                      |                   |               |               |              |
|                     | Frequenc                | y Scan Observati     | ons Without Se    | OUICES        |               |              |
|                     |                         | y coun choortun      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |
|                     |                         | \A/                  | auge entibiliti   |               |               |              |
|                     |                         | ı                    | susceptibilitie   |               |               |              |
|                     |                         | Yes                  |                   | No            |               | l            |
|                     |                         |                      |                   |               |               |              |
|                     |                         |                      |                   |               |               |              |



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|             |                    |             | With Cs-137 and | Cf-252 Sources    | 3             |             |   |   |
|-------------|--------------------|-------------|-----------------|-------------------|---------------|-------------|---|---|
|             |                    |             |                 |                   |               |             |   |   |
|             | Nominal            |             |                 |                   |               |             |   |   |
|             | No RF              |             | Gamma           | a Source Data:    |               |             |   |   |
|             | Gamma              |             |                 |                   |               |             |   |   |
| 1           |                    | (add units) | Neutro          | n Source Data:    |               |             |   |   |
| 2           |                    | ,           |                 |                   |               |             |   |   |
| 3           |                    |             |                 |                   |               |             |   |   |
| 4           |                    |             | Acceptar        | ice Range (Gar    | nma)          |             |   |   |
| 5           |                    |             | #DIV/0!         | to                | #DIV/0!       |             |   |   |
| 6           |                    |             | low (-15%)      |                   | high (+15%)   |             |   |   |
| 7           |                    |             | (,              |                   | g (,          |             |   |   |
| . 8         |                    |             | Accentar        | nce Range (Neu    | itron)        |             |   |   |
| 9           |                    |             | #DIV/0!         | to                | #DIV/0!       |             |   |   |
| 10          |                    |             | low (-15%)      |                   | high (+15%)   |             |   |   |
|             | #DIV/0!            | 1           | 10W (-10/0)     |                   | mgn (*1576)   |             |   |   |
| Mean<br>STD | #DIV/0!<br>#DIV/0! | -           |                 |                   |               |             |   |   |
|             | #DIV/0!            |             |                 |                   |               |             |   |   |
| COV%        | #DIV/0!            |             |                 |                   |               |             |   |   |
|             |                    |             | Fred            | uency Scan O      | bservations w | ith Sources | 8 |   |
|             |                    |             |                 |                   |               |             |   |   |
|             | Nominal            |             |                 |                   |               |             |   |   |
|             | No RF              |             |                 |                   |               |             |   |   |
|             | Neutron            |             |                 |                   |               |             |   |   |
| 1           |                    | (add units) |                 |                   |               |             |   |   |
| 2           |                    |             |                 |                   |               |             |   |   |
| 3           |                    |             |                 |                   |               |             |   |   |
| 4           |                    |             |                 |                   |               |             |   |   |
| 5           |                    |             |                 |                   |               |             |   |   |
| 6           |                    |             |                 |                   |               |             |   |   |
| 7           |                    |             |                 |                   |               |             |   |   |
| 8           |                    |             |                 |                   |               |             |   |   |
| 9           |                    |             |                 |                   |               |             |   |   |
| 10          |                    |             |                 |                   |               |             |   |   |
|             | #DIV/01            |             |                 |                   |               |             |   |   |
| Mean        | #DIV/0!            | 1           |                 |                   |               |             |   |   |
| STD         | #DIV/0!            |             |                 |                   |               |             |   |   |
| COV%        | #DIV/0!            |             |                 | e susceptibilitie |               |             |   |   |
|             |                    |             | Yes             |                   | No            |             | J |   |
|             |                    |             |                 |                   |               |             |   |   |
|             |                    |             |                 |                   |               |             |   |   |
|             | Comments:          |             |                 |                   |               |             |   |   |
|             |                    |             |                 |                   |               |             |   |   |
|             |                    |             |                 |                   |               |             |   |   |
|             |                    |             |                 |                   |               |             |   |   |
|             |                    |             |                 |                   |               |             |   |   |
|             |                    |             |                 |                   |               |             |   |   |
| (           | completed by:      |             |                 |                   | Date:         |             | - |   |
|             |                    |             |                 |                   |               |             |   |   |
|             | Reviewed by:       |             |                 |                   | Date:         |             |   |   |
|             |                    |             |                 |                   | Date.         |             |   | - |



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|                         | 0 1 0 5                     |                    |                  |                                       |               |     |     |
|-------------------------|-----------------------------|--------------------|------------------|---------------------------------------|---------------|-----|-----|
|                         | Section 8.5                 |                    |                  |                                       |               |     |     |
|                         | Test and                    | d Data Rep         | ort              |                                       |               |     |     |
|                         |                             |                    |                  |                                       |               |     |     |
| Manufacturer:           |                             |                    |                  |                                       |               | _   |     |
| Model:                  |                             | Se                 | rial Number:     |                                       |               |     |     |
| Poquiromont             | The instrument should be    | a fully functional | when exposed     | to DC magne                           | tic fields in |     |     |
| Requirement.            | three orientations relative |                    |                  |                                       |               |     |     |
|                         |                             | gaace a            |                  | , , , , , , , , , , , , , , , , , , , |               | _   |     |
| Note:                   | Comments are required       | when the require   | ment is not veri | fied.                                 |               |     |     |
|                         |                             |                    |                  |                                       |               |     |     |
| Ambient Conditions:     | °C                          |                    | %RH              |                                       | in HG         |     |     |
| Ambient Conditions:     | C                           |                    | %KH              |                                       | III HG        |     |     |
| Test Equipment Used:    |                             |                    |                  |                                       |               |     |     |
| 100                     |                             |                    |                  |                                       |               |     |     |
| Gamma                   | Source Data:                |                    |                  |                                       |               |     |     |
|                         |                             |                    |                  |                                       |               |     |     |
| Neutron                 | Source Data:                |                    |                  |                                       |               | _   |     |
|                         | Measurement Results V       | Vithout Sources    | 1                |                                       |               |     |     |
|                         |                             |                    |                  |                                       |               |     |     |
|                         |                             | Yes                | No               |                                       |               |     |     |
| Were there              | any functional change       | s?                 |                  |                                       |               |     |     |
| NOTE (                  |                             |                    |                  |                                       |               |     |     |
| NOTE – tuno             | ctional changes include a   | larms or spurious  | indications.     |                                       |               |     |     |
|                         |                             |                    |                  |                                       |               |     |     |
|                         |                             |                    |                  | Orient                                | ation         |     |     |
|                         |                             | Ini                | tial             | Se                                    | cond          | Th  | ird |
|                         |                             | Yes                | No               | Yes                                   | No            | Yes | No  |
| Did the instrume        | nt alarm during the tes     | t?                 |                  |                                       |               |     |     |
|                         |                             |                    |                  |                                       |               |     |     |
| Did the instrument disp | lay spurious indication     | s?                 |                  |                                       |               |     |     |
|                         |                             |                    |                  |                                       |               |     |     |
| Observations:           |                             |                    |                  |                                       |               |     |     |
| Obaci validila.         |                             | +                  |                  |                                       |               | _   |     |
|                         |                             |                    |                  |                                       |               |     |     |
|                         |                             |                    |                  |                                       |               |     |     |



| TEST AND EVALUATION PROTOCOL              | <b>TEP NO.</b> N42.34       | PREPARED BY:<br>DIV682 |                      |
|---|-----------------------------|------------------------|----------------------|
| TITLE: Hand Held Radionuclide Identifiers | <b>EFF. DATE</b> 2010-11-09 | <b>REV.</b> 3.03       | <b>PAGE</b> 68 of 78 |

|  | '  |   | Measure   | ment Results V                                     | Vith Cs-137   |                                    |                               |           |
|--|--|---|---|--|---|------------------------------------|-------------------------------|-----------|
|  | Initial Orie   | ontation  |   | Second O   | rientation  | Third Orie                         | ntation                       |           |
|  | Nominal  | 10 Gauss  |   | Nominal  | 10 Gauss  | Nominal                            | 10 Gauss                      | -         |
|  |  |   |   |  |   |                                    |                               |           |
| 1  | Zero Intensity   | (DC)  |   | Zero Intensity                                     | (DC)  | Zero Intensity                     | (DC)                          | (add uni  |
| 2  |  |   |   |  |   |                                    |                               | (add dill |
| 3  |  |   |   |  |   |                                    |                               |           |
| 4<br>5   |  |   |   |  |   |                                    |                               |           |
| 6  |  |   |   |  |   |                                    |                               |           |
| 7  |  |   |   |  |   |                                    |                               |           |
| 8  |  |   |   |  |   |                                    |                               |           |
| 9  |  |   |   |  |   |                                    |                               |           |
| 10   | # <b>5</b> 11//61  | # <b>5</b> 11//61                                     |   |  | # <b>3</b> 11/61  | (17.1) (16.1                       | # <b>5</b> 11//61             |           |
| Mean<br>STD  | #DIV/0!<br>#DIV/0!   | #DIV/0!<br>#DIV/0!                                    |   | #DIV/0!<br>#DIV/0!                                 | #DIV/0!<br>#DIV/0!  | #DIV/0!<br>#DIV/0!                 | #DIV/0!<br>#DIV/0!            |           |
| COV%   | #DIV/0!  | #DIV/0!<br>#DIV/0!                                    |   | #DIV/0!  | #DIV/0!   | #DIV/0!                            | #DIV/0!                       |           |
| COV 70   | Conf-Int (-)   | #DIV/0!   |   | Conf-Int (-)                                       | #DIV/0!   | Conf-Int (-)                       | #DIV/0!                       |           |
|  | Conf-Int (+)   | #DIV/0!   |   | Conf-Int (+)                                       | #DIV/0!   | Conf-Int (+)                       | #DIV/0!                       |           |
|  | , ,  |   |   |  |   |                                    |                               |           |
|  |  | Acce  | eptance Ra  | nge_   |   |                                    |                               |           |
|  | Initia   | l Orientation:  | #DIV/0!   | to   | #DIV/0!   |                                    |                               |           |
|  |  |   | low -15%  |  | high +15%   |                                    |                               |           |
|  | Second   | d Orientation:  | #DIV/0!   | to   | #DIV/0!   |                                    |                               |           |
|  | Second   | d Offeritation.                                       | low -15%  | ιο   | high +15%   |                                    |                               |           |
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|  | Third  | d Orientation:  | #DIV/0!   | to   | #DIV/0!   |                                    |                               |           |
|  |  |   | low -15%  |  | high +15%   |                                    |                               |           |
|  |  |   | Measure   | □<br>ment Results V                                | Vith Cf-252   |                                    |                               |           |
|  |  |   |   |  |   |                                    |                               |           |
|  | Initial Orie   |   |   | Second O   |   | Third Orie                         |                               | 1         |
|  | Nominal Zero Intensity   | 10 Gauss<br>(DC)                                      |   | Nominal<br>Zero Intensity                          | 10 Gauss<br>(DC)  | Nominal Zero Intensity             | 10 Gauss<br>(DC)              |           |
| 1  | _oro interiority   | (33)  |   | Zoro interiorty                                    | (30)  | Zoro interiority                   | (50)                          | (add unit |
| 2  |  |   |   |  |   |                                    |                               | Ì         |
| 3  |  |   |   |  |   |                                    |                               |           |
|  |  |   |   |  |   |                                    |                               |           |
| 4  |  |   |   |  |   |                                    |                               |           |
| 4<br>5   |  |   |   |  |   |                                    |                               |           |
| 4  |  |   |   |  |   |                                    |                               |           |
| 4<br>5<br>6<br>7<br>8  |  |   |   |  |   |                                    |                               |           |
| 4<br>5<br>6<br>7<br>8<br>9                                     |  |   |   |  |   |                                    |                               |           |
| 4<br>5<br>6<br>7<br>8<br>9                                     | #DIV/01  | #DIV/0I   |   | #DIV/0   | #DIV/01   | #DW/01                             | #DIV/01                       |           |
| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b>                | #DIV/0!  | #DIV/0!   |   | #DIV/0!  | #DIV/0!   | #DIV/0!                            | #DIV/0!                       |           |
| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!  | #DIV/0!   |   | #DIV/0!  | #DIV/0!   | #DIV/0!                            | #DIV/0!                       |           |
| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b>                |  |   |   |  |   |                                    |                               |           |
| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!<br>#DIV/0!   | #DIV/0!<br>#DIV/0!                                    |   | #DIV/0!<br>#DIV/0!                                 | #DIV/0!<br>#DIV/0!  | #DIV/0!<br>#DIV/0!                 | #DIV/0!<br>#DIV/0!            |           |
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| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)   | #DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!              | eptance Ra  | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)                 | #DIV/0!<br>#DIV/0!<br>#DIV/0!   | #DIV/0!<br>#DIV/0!<br>Conf-Int (-) | #DIV/0!<br>#DIV/0!<br>#DIV/0! |           |
| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)<br>Conf-Int (+)                         | #DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!              | #DIV/0!   | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)                 | #DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!  | #DIV/0!<br>#DIV/0!<br>Conf-Int (-) | #DIV/0!<br>#DIV/0!<br>#DIV/0! |           |
| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)<br>Conf-Int (+)                         | #DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!              | -   | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)<br>Conf-Int (+) | #DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!  | #DIV/0!<br>#DIV/0!<br>Conf-Int (-) | #DIV/0!<br>#DIV/0!<br>#DIV/0! |           |
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| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)<br>Conf-Int (+)                         | #DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!              | #DIV/0!<br>low -15%<br>#DIV/0!                        | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)<br>Conf-Int (+) | #DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!<br>high +15%                                      | #DIV/0!<br>#DIV/0!<br>Conf-Int (-) | #DIV/0!<br>#DIV/0!<br>#DIV/0! |           |
| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b><br><b>STD</b>  | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)<br>Conf-Int (+)                         | #DIV/0! #DIV/0! #DIV/0! #DIV/0! #DIV/0!               | #DIV/0!<br>low -15%                                   | #DIV/0!<br>#DIV/0!<br>Conf-Int (-)<br>Conf-Int (+) | #DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!<br>high +15%                                      | #DIV/0!<br>#DIV/0!<br>Conf-Int (-) | #DIV/0!<br>#DIV/0!<br>#DIV/0! |           |
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| 4<br>5<br>6<br>7<br>8<br>9<br>10<br><b>Mean</b><br>STD<br>COV% | #DIV/0! #DIV/0! Conf-Int (-) Conf-Int (+)  Initia                          | #DIV/0! #DIV/0! #DIV/0! #DIV/0!  Acce al Orientation: | #DIV/0!<br>low -15%<br>#DIV/0!<br>low -15%<br>#DIV/0! | #DIV/0! #DIV/0! Conf-Int (-) Conf-Int (+) to       | #DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!<br>#DIV/0!<br>high +15%<br>#DIV/0!<br>high +15%              | #DIV/0!<br>#DIV/0!<br>Conf-Int (-) | #DIV/0!<br>#DIV/0!<br>#DIV/0! |           |



| TEST AND EVALUATION PROTOCOL  | <b>TEP NO.</b> N42.34       | PREPARED BY:<br>DIV682 |                      |  |
|---|-----------------------------|------------------------|----------------------|--|
| <b>TITLE:</b> Hand Held Radionuclide Identifiers for use in Homeland Security | <b>EFF. DATE</b> 2010-11-09 | <b>REV.</b> 3.03       | <b>PAGE</b> 69 of 78 |  |

|               | 5             | Section                      | 9.1 Vibra                  | ation  |              |               |        |
|---------------|---------------|------------------------------|----------------------------|--|--------------|---------------|--------|
|               | T             | est Dat                      | a and R                    | eport  |              |               |        |
| Manufacturer: |               |                              |                            |  |              |               |        |
| Model:        |               |                              | S                          | erial Number:  |              |               |        |
| Requirement:  | handheld or h | and-carried<br>all not be af | equipment.<br>fected by ex | ire to vibrations<br>The physical co<br>posure (e.g.: so | ondition and | functionality | of the |
| Note:         | Comments ar   | e required w                 | /hen the requ              | irement is not   | verified.    |               |        |
| Ambient       | Conditions:   |                              | °C                         |  | %RH          |               | in HG  |
| Test Equip    | oment Used:   |                              |                            |  |              |               |        |
| Gamma S       | Source Data:  |                              |                            |  |              |               |        |
| Neutron S     | Source Data:  |                              |                            |  |              |               |        |



| TEST AND EVALUATION PROTOCOL  | <b>TEP NO.</b> N42.34       | PREPARED BY:<br>DIV682 |                      |
|---|-----------------------------|------------------------|----------------------|
| <b>TITLE:</b> Hand Held Radionuclide Identifiers for use in Homeland Security | <b>EFF. DATE</b> 2010-11-09 | <b>REV.</b> 3.03       | <b>PAGE</b> 70 of 78 |

|                       |             | After          | After       | After        |             |            |         |            |
|-----------------------|-------------|----------------|-------------|--------------|-------------|------------|---------|------------|
|                       | Pre-test    | Position A     | Position B  | Position C   |             |            |         |            |
|                       |             | POSITION A     | POSITION B  | POSITION C   | (add unita) |            |         |            |
|                       | 1           |                |             |              | (add units) |            |         |            |
|                       | 2           |                |             |              |             |            |         |            |
|                       | 3           |                |             |              |             |            |         |            |
|                       | 4           |                |             |              |             |            |         |            |
|                       | 5           |                |             |              |             |            |         |            |
|                       | 6           |                |             |              |             |            |         |            |
|                       | 7           |                |             |              |             |            |         |            |
|                       | 8           |                |             |              |             |            |         |            |
|                       | 9           |                |             |              |             | Accep      | tance F | Range:     |
|                       | 10          |                |             |              |             |            |         |            |
| M                     | ean #DIV/0! | #DIV/0!        | #DIV/0!     | #DIV/0!      |             | #DIV/0!    | to      | #DIV/0!    |
|                       | STD #DIV/0! | #DIV/0!        | #DIV/0!     | #DIV/0!      |             | low (-15%) |         | high (+15° |
| CO                    |             | #DIV/0!        | #DIV/0!     | #DIV/0!      |             | ,          |         | 3 ( -      |
|                       |             |                |             | -            |             |            |         |            |
|                       |             |                |             |              |             |            |         |            |
|                       |             | Did the instru | ment respon | d to neutron | s?          |            |         |            |
|                       | _           | Pre-test       | Position A  | Position B   | Position C  |            |         |            |
|                       | Yes         | 110100         |             |              |             |            |         |            |
|                       | No          |                |             |              |             |            |         |            |
|                       | 110         |                |             |              |             |            |         |            |
|                       |             |                |             |              |             |            |         |            |
| Inspection Resu       | lts:        |                |             |              |             |            |         |            |
| mopositori ress       |             |                |             |              |             |            |         | _          |
|                       |             |                |             |              |             |            |         | _          |
|                       |             |                |             |              |             |            |         | -          |
|                       |             |                |             |              |             |            |         | -          |
|                       |             |                |             |              |             |            |         |            |
| Comme                 | nts:        |                |             |              |             |            |         |            |
| 0011111101            | 1.0.        |                |             |              |             |            |         | -          |
|                       |             |                |             |              |             |            |         |            |
|                       |             | +              |             |              | -           |            |         |            |
|                       |             |                |             |              |             |            |         |            |
|                       |             |                |             |              |             |            |         |            |
|                       |             |                |             |              |             |            |         |            |
| Performed             | hv:         |                |             |              | Date:       |            |         |            |
| Performed             | by:         |                |             |              | Date:       |            |         |            |
| Performed<br>Reviewed |             |                |             |              | Date:       |            |         |            |



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|              |             | Section     | on 9.2 M            | echanica            | l Shock             |             |                                   |         |             |  |  |
|--------------|-------------|-------------|---------------------|---------------------|---------------------|-------------|-----------------------------------|---------|-------------|--|--|
|              |             | Т           | est Data            | and Rep             | ort                 |             |                                   |         |             |  |  |
|              |             |             |                     |                     |                     |             |                                   |         |             |  |  |
| Manuf        | acturer:    |             |                     |                     |                     |             |                                   |         |             |  |  |
|              | Model:      |             |                     | S                   | erial Number:       |             |                                   |         |             |  |  |
|              |             |             |                     |                     |                     |             |                                   |         |             |  |  |
| Requi        | rement:     |             |                     |                     |                     |             | peak accelerati                   |         |             |  |  |
|              |             |             |                     |                     | -                   | -           | s. The physica<br>these shocks (e |         |             |  |  |
|              |             |             | •                   |                     | nall not come lo    | •           | oncono (c                         | J.g.,   |             |  |  |
|              |             |             |                     |                     |                     |             |                                   |         |             |  |  |
|              |             |             |                     |                     |                     |             |                                   |         |             |  |  |
|              |             |             |                     |                     |                     |             |                                   |         |             |  |  |
|              | Noto:       | Comments ar | e required wh       | nen the require     | ment is not ver     | ified       |                                   |         |             |  |  |
|              | 14016.      | Comments at | o required Wi       | ion the require     | mont is not ven     |             |                                   |         |             |  |  |
|              |             |             |                     |                     |                     |             |                                   |         |             |  |  |
| Ambient Con  | ditions:    |             | °C                  |                     | %RH                 |             | in HG                             |         |             |  |  |
|              |             |             |                     |                     |                     |             |                                   |         |             |  |  |
| Test Equipme | nt Used:    |             |                     |                     |                     |             |                                   |         | _           |  |  |
|              | Gamma       | Source Data |                     |                     |                     |             |                                   |         |             |  |  |
|              | Jannina     | Jource Data |                     |                     |                     |             |                                   |         |             |  |  |
| - 1          | Neutron     | Source Data | :                   |                     |                     |             |                                   |         |             |  |  |
|              |             |             |                     |                     |                     |             |                                   |         |             |  |  |
|              |             |             |                     | • • •               |                     |             |                                   |         |             |  |  |
|              |             | Pre-test    | After<br>Position A | After<br>Position B | After<br>Position C |             |                                   |         |             |  |  |
|              | 1           | r re-test   | r osition A         | F OSITION B         | F OSITION C         | (add units) |                                   |         |             |  |  |
|              | 2           |             |                     |                     |                     | (add armo)  |                                   |         |             |  |  |
|              | 3           |             |                     |                     |                     |             |                                   |         |             |  |  |
|              | 4           |             |                     |                     |                     |             |                                   |         |             |  |  |
|              | 5           |             | 1                   |                     |                     |             |                                   |         |             |  |  |
|              | 6<br>7      |             |                     |                     |                     |             |                                   |         |             |  |  |
|              | 8           |             |                     |                     |                     |             |                                   |         |             |  |  |
|              | 9           |             |                     |                     |                     |             | Accept                            | ance Ra | nge:        |  |  |
|              | 10          |             |                     |                     |                     |             |                                   |         |             |  |  |
|              | Mean        |             | #DIV/0!             | #DIV/0!             | #DIV/0!             |             | #DIV/0!                           | to      | #DIV/0!     |  |  |
|              | STD<br>COV% |             | #DIV/0!<br>#DIV/0!  | #DIV/0!<br>#DIV/0!  | #DIV/0!<br>#DIV/0!  |             | low (-15%)                        |         | high (+15%) |  |  |
|              | COV %       | #DIV/U!     | #DIV/U!             | #DIV/U!             | #101070!            |             |                                   |         |             |  |  |
|              |             |             |                     |                     |                     |             |                                   |         |             |  |  |
|              |             | D           | oid the instru      | ment respon         | d to neutrons?      | ?           |                                   |         |             |  |  |
|              |             |             | Pre-test            | Position A          | Position B          | Position C  |                                   |         |             |  |  |
|              |             | Yes         |                     |                     |                     |             |                                   |         |             |  |  |
|              |             | No          |                     |                     |                     |             |                                   |         |             |  |  |



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| Inspection Results:  Comments: |  |
|--------------------------------|--|
|                                |  |
| Comments:                      |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
| Performed by: Date:            |  |
| Performed by.                  |  |
| Reviewed by: Date:             |  |
| neviewed by.                   |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
| Orientations:                  |  |
| LOD DI                         |  |
| LCD Display                    |  |
| Position A Position B          |  |
| LCD Display                    |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
| Position C                     |  |
| 1. Gallon G                    |  |
|                                |  |
|                                |  |
|                                |  |
|                                |  |
| LCD Display                    |  |
|                                |  |
|                                |  |
|                                |  |



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|    | Section 9.3 Impact (Microphonics)  |                           |             |            |             |              |          |       |  |  |
|----|--|---------------------------|-------------|------------|-------------|--------------|----------|-------|--|--|
|    | Test Data and Report   |                           |             |            |             |              |          |       |  |  |
|    |  |                           |             |            |             |              |          |       |  |  |
| Ma | nufacturer:  |                           |             |            |             |              |          |       |  |  |
|    | Model:   |                           |             | Serial     | Number:     |              |          |       |  |  |
| Re | Requirement: The instrument's response, both gamma and neutron, shall be unaffected microphonic conditions such as those that may occur from low intensity in from sharp contact with hard surfaces. |                           |             |            |             |              |          | •     |  |  |
|    | Note:  | Comments                  | are require | d when the | e requireme | ent is not w | erified. |       |  |  |
|    | Ambient (  | Conditions:<br>ment Used: |             | °C         |             | %RH          |          | in HG |  |  |
|    | Gamma So   | ource Data:               |             |            |             |              |          |       |  |  |
|    | Neutron Sc   | ource Data:               |             |            |             |              |          |       |  |  |



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|                                     |                                   |                  | Without                | ources         |                      |           |          |        |          |       |      |       |      |       |      |       |
|-------------------------------------|-----------------------------------|------------------|------------------------|----------------|----------------------|-----------|----------|--------|----------|-------|------|-------|------|-------|------|-------|
|                                     |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  |                        |                | Side                 | No. 1     | Side     | No. 2  | Side     | No. 3 | Side | No. 4 | Side | No. 5 | Side | No. 6 |
|                                     |                                   |                  |                        |                | Yes                  | No        | Yes      | No     | Yes      | No    | Yes  | No    | Yes  | No    | Yes  | No    |
| Did t                               | he gamma                          | response remai   | n stable during        | the test?      | )                    |           |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  | eutron reading         |                |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     | D                                 | id the instrumer | nt alarm during        | the test?      | ,                    |           |          |        |          |       |      |       |      |       |      |       |
| Were                                | e there any                       | functional chan  | ges due to the         | impacts?       |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     | Did the i                         | nstrument displ  | ay spurious ind        | ications?      |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  | Gamma and N            | eutron T       | ests                 |           |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     | Pretest                           |                  | Impact                 | Side           | Side                 | Side      | Side     | Side   | Side     |       |      |       |      |       |      |       |
|                                     | Response                          |                  | Number                 | No. 1          | No. 2                | No. 3     | No. 4    | No. 5  | No. 6    |       |      |       |      |       |      |       |
| ŀ                                   | Gamma                             |                  |                        |                | Readings             | After Eac | h Impact |        |          |       |      |       |      |       |      |       |
| 1                                   |                                   | (add units)      | 1                      |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 2                                   |                                   |                  | 2                      |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 3                                   |                                   |                  | 3                      |                | Ļ                    |           |          |        | <u> </u> |       |      |       |      |       |      |       |
| 4                                   |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      | _     |
| 5                                   |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 6                                   |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 7<br>8                              |                                   | -                | A                      |                | 1                    |           |          |        |          |       |      |       |      |       |      |       |
| 9                                   |                                   |                  |                        | ptance R       |                      |           |          |        |          |       |      |       |      |       |      |       |
| 10                                  |                                   |                  | #DIV/0!<br>low (-15 %) | to             | #DIV/0!<br>high (+15 | 0/. \     |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  | 10W (-13 76)           |                | riigir (+ 13         | /0)       |          |        |          |       |      |       |      |       |      |       |
| Mean<br>STD                         | #DIV/0!<br>#DIV/0!                |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| OV%                                 |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| JUV /0                              | #DIV/U!                           |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     | Pretest                           |                  | Impact                 | Side           | Side                 | Side      | Side     | Side   | Side     |       |      |       |      |       |      |       |
|                                     | Response                          |                  | Number                 | No. 1          | No. 2                | No. 3     | No. 4    | No. 5  | No. 6    |       |      |       |      |       |      |       |
|                                     | Neutron                           |                  | Humber                 | 110. 1         |                      | After Eac |          | 110. 0 | 110. 0   |       |      |       |      |       |      |       |
| 1                                   | -10 411 011                       | (add units)      | 1                      |                | I                    |           |          |        |          |       |      |       |      |       |      |       |
| 2                                   |                                   | (add armo)       | 2                      |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 3                                   |                                   |                  | 3                      |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 4                                   |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 5                                   |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 6                                   |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
|                                     |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 7                                   |                                   |                  |                        |                |                      |           |          |        |          |       |      |       |      |       |      |       |
| 8                                   |                                   |                  |                        | ptance R       |                      |           |          |        |          |       |      |       |      |       |      |       |
| 8<br>9                              |                                   |                  | #DIV/0!                | ptance R<br>to | #DIV/0!              |           |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10                        |                                   |                  |                        |                |                      | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean                | #DIV/0!                           |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD         | #DIV/0!<br>#DIV/0!                |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD         | #DIV/0!                           |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD         | #DIV/0!<br>#DIV/0!                |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD         | #DIV/0!<br>#DIV/0!                |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD<br>COV% | #DIV/0!<br>#DIV/0!<br>#DIV/0!     |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD<br>COV% | #DIV/0!<br>#DIV/0!                |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD<br>COV% | #DIV/0!<br>#DIV/0!<br>#DIV/0!     |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD<br>COV% | #DIV/0!<br>#DIV/0!<br>#DIV/0!     |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD<br>COV% | #DIV/0!<br>#DIV/0!<br>#DIV/0!     |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD<br>COV% | #DIV/0!<br>#DIV/0!<br>#DIV/0!     |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD<br>COV% | #DIV/0!<br>#DIV/0!<br>#DIV/0!     |                  | #DIV/0!                |                | #DIV/0!              | %)        |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD<br>COV% | #DIV/0! #DIV/0! #DIV/0! Comments: |                  | #DIV/0!                |                | #DIV/0!              |           |          |        |          |       |      |       |      |       |      |       |
| 8<br>9<br>10<br>Mean<br>STD<br>COV% | #DIV/0!<br>#DIV/0!<br>#DIV/0!     |                  | #DIV/0!                |                | #DIV/0!              | %) Date:  |          |        |          |       |      |       |      |       |      |       |
| 8 9 10 Mean STD COV%                | #DIV/0! #DIV/0! #DIV/0! Comments: |                  | #DIV/0!                |                | #DIV/0!              |           |          |        |          |       |      |       |      |       |      |       |



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|           |                      | Se  | ections 10 - Documentation  | 1                |               |          |  |  |  |
|-----------|----------------------|---|---|------------------|---------------|----------|--|--|--|
|           |                      |   | Test Data and Report  |                  |               |          |  |  |  |
|           |                      |   | _   |                  |               |          |  |  |  |
| Man       | ufacturer:<br>Model: |   | Sorial  | Number:          |               |          |  |  |  |
|           | WIOGE1.              |   | Serial  | Nulliber.        |               |          |  |  |  |
| Requ      | irements:            | 10.1 Certif   | ficate  | J                |               |          |  |  |  |
| _         |                      |   | te shall accompany each hand held nuclic  | de identifier    | , giving at l | east the |  |  |  |
|           |                      | <ul><li>b) Type of</li><li>c) List of r</li><li>d) Exposu</li></ul> | <ul> <li>) Manufacturer's name or registered trademark,</li> <li>) Type of the instrument and serial number,</li> <li>) List of radionuclides to which the instrument was tested,</li> <li>) Exposure rate range,</li> <li>) Tests performed</li> </ul> |                  |               |          |  |  |  |
|           |                      | Each instru   | ation and maintenance manual ument shall be supplied with operating ins locumentation.  | tructions, r     | maintenanc    | e, and   |  |  |  |
|           |                      |   |   |                  |               |          |  |  |  |
|           | Note:                | -   | lata sheet per model is required. Commer<br>nt is not verified.   | nts are requ     | ired when t   | ine      |  |  |  |
|           |                      |   |   |                  | Ve            | rify     |  |  |  |
|           |                      |   |   |                  | Yes           | No       |  |  |  |
|           |                      |   | Did a ceritifcate accompany the ins   | trument?         | 100           | 140      |  |  |  |
|           |                      |   |   |                  |               |          |  |  |  |
|           | If yes, did          | it include  | d the following information:  |                  |               |          |  |  |  |
|           |                      |   | Manufacturer's name of registered to  | rademark?        |               |          |  |  |  |
|           |                      |   | Type of instrument and seria  | l number?        |               |          |  |  |  |
|           |                      |   | Type of instrument and sena   | ii iidiiibei : [ |               |          |  |  |  |
|           |                      | List o  | f radionuclides to which the instrument wa  | as tested?       |               |          |  |  |  |
|           |                      |   |   |                  |               |          |  |  |  |
|           |                      |   | Exposure ra   | ate range?       |               |          |  |  |  |
|           |                      |   | Tests p   | erformed?        |               |          |  |  |  |
|           |                      |   |   |                  |               |          |  |  |  |
|           | Was the fo           | ollowing d  | ocumentation supplied?  |                  | Yes           | No       |  |  |  |
|           |                      |   | Operating inst  | trumetions       |               |          |  |  |  |
|           |                      |   | Maintenance docu  | mentation        |               |          |  |  |  |
|           |                      |   |   |                  |               |          |  |  |  |
|           |                      |   | Technical docu  | ımentation       |               |          |  |  |  |
|           |                      |   |   |                  |               |          |  |  |  |
| Comments: |                      |   |   |                  |               |          |  |  |  |
|           |                      |   |   |                  |               |          |  |  |  |
|           |                      |   |   |                  |               |          |  |  |  |
| Com       | pleted by:           |   |   | Date:            |               |          |  |  |  |
| Rev       | iewed by:            |   |   | Date:            |               |          |  |  |  |