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Attachment 1 – Xetex Telescan Information Summary ................................................................. 16
1.0 PURPOSE AND SCOPE

1.1 Purpose

This procedure provides specific information regarding the Xetex Telescan extendable survey instrument.

1.2 Scope

This procedure involves operation and performing operational, source and response checks of the Xetex Telescan extendable survey instrument.

2.0 INFORMATION

2.1 General Information

2.1.1 Specific information regarding theory of operation, calibration, maintenance and instrument specifications and limitations, including environmental and interfering radiation can be found in MA-562, Radiation Protection Instrument Manual (or equivalent).

2.2 Terms and Definitions

- ICCS  Ion Chamber Check Source
- LBS  Linear Beta Source
3.0 PRECAUTIONS AND LIMITATIONS

3.1 Personnel Safety

**WARNING** - Shock Hazard. When telescoping pole is extended, care should be taken to avoid contact with electrical hazards (e.g., overhead electrical lines) resulting in electrical shock injury or death.

3.2 Equipment Safety

**CAUTION** - Take care when moving the instrument not to hit the telescoping pole against other objects such as walls, poles, or light fixtures to prevent damaging the telescoping pole.

3.3 Radiation and Contamination Control

3.3.1 When this procedure is worked in radiological areas, an approved radiological work permit (RWP) is required. If radiological conditions or work performed falls outside the scope of the RWP, all work activities must be discontinued until a new or revised RWP has been issued in accordance with TFC-ESHQ-RP_RWP-C-03.

3.4 Limits

**NOTE** - No contact correction factors have been established for dimensions less than five (5) inches.

The Xetex Telescan may be used for general area photon (gamma and x-ray) and contact readings for surfaces greater than five (5) inches in diameter. Care must be used when making contact measurements to position the appropriate detector over the center of the area being measured or the highest reading obtainable for a contact reading.

The high range detector may be used for indication only readings unless a proper source check of the high range detector has been performed and is current.

The Xetex Telescan responds to photons within ± 15% of the true exposure rate from 70 keV to 1 MeV. The Xetex Telescan does NOT measure beta dose rate nor does it respond to alpha or neutron radiations. The Xetex Telescan is acceptable to use in the temperature range of 0 to 104 °F, correction factors are required when the temperature is 32 °F or below.
4.0 PREREQUISITES

4.1 Special Tools, Equipment, and Supplies

The following supplies may be needed to perform this procedure:

- Ion Chamber Check Source (ICCS) or Linear Beta Source (LBS)
- Four C-cell alkaline batteries.

4.2 Performance Documents

The following documents may be needed to perform this procedure:

- Instrument Service Tag
- A-6002-895, Daily Instrument Source Check Log
- BL-6006-213, Daily Source Check
5.0 PROCEDURE

5.1 Operational Check

NOTE - Calibration expires at midnight of the expiration date on the calibration sticker.

5.1.1 CONFIRM calibration of instrument is current.

5.1.2 CONFIRM source check of instrument is current.

NOTE - An inspection of the instrument is required before using the Xetex Telescan.

5.1.3 INSPECT the instrument for the following physical defects:

- Broken meter glass
- Loose knobs
- Any other defect that would affect operation.

5.1.3.1 IF any defects are found, TAG instrument with complete Instrument Service Tag, identifying problem AND

PREPARE the instrument for pickup for servicing by the calibration service provider.

NOTE - The malfunction light may turn on during switching to battery position due to switching noise. If light resets the procedure may proceed.

5.1.4 TURN selector switch to “Battery” position AND

CONFIRM meter reading falls within “Battery Check” band on meter face.

5.1.4.1 IF “Battery” indicates out of “Battery Check Range,”

REPLACE the four C-cell batteries AND

REPEAT Step 5.1.4.
5.1 **Operational Check (Cont.)**

NOTE - The Xetex Telescan performs an internal check when turned on.

5.1.5 **TURN** selector switch to X.1 position (lowest range) **AND**

**ALLOW** a 10 second warm-up.

NOTE - Any faults of the Xetex Telescan will be signaled by a flashing malfunction light and an audible alarm.

5.1.6 **IF** malfunction light turns **ON** (other than switching to battery), **TAG** instrument with completed Instrument Service Tag, identifying problem **AND**

**PREPARE** the instrument for pickup and servicing by the calibration service provider.

5.1.7 **IF** it is determined that the Instrument Service Tag was installed in error, **PERFORM** the following:

5.1.7.1 **CONFIRM** the instrument passes all required operational checks.

5.1.7.2 **OBTAIN** concurrence from the First Line Manager to place instrument back into service.

5.1.7.3 **REMOVE** the Instrument Service Tag.

5.1.7.4 **PLACE** the instrument back in service.
5.2 Source Check

NOTE - Extendable survey instruments may be source checked using a variety of sources. Typical sources available include Ion Chamber Check Source (ICCS) or Linear Beta Source (LBS). The only criteria for the source used is that it shall provide a field suitable to obtain an on scale response at one point within the range of the low range detector (x.1, x1, x10, x100 mR/hr). A satisfactory check on any one of the low range detector ranges is acceptable.

- The high range detector is not typically source checked because of the high exposure rates required to get a response from the high range detector (x1, x10, x100, R/hr ranges). In this case, the high range detector may be used for indication only readings.

Initial Source Check

NOTE - Steps within this section may be performed in any logical order as long as all steps are completed.

- Typically, the low range detector can be source checked using an Ion Chamber Check Source ICCS (used for the CP/RO-20) in the 5K (mR/h) position or the OS (off scale) position.

5.2.1 Two machined grooves are located on the detector, CENTER the machined groove closest to the end of the detector over the source.

5.2.2 SELECT the appropriate source strength to achieve an on scale response for at least one of the low scale ranges (or high scale ranges if source checking high range scale) AND

ALLOW the instrument’s reading to stabilize.

5.2.3 OBSERVE the instrument's response.
5.2 Source Check (Cont.)

5.2.4 EVALUATE initial source response as follows:

5.2.4.1 IF response is within +/- 20% of the mean or typical instrument response for that source (3-5 instruments),

OR

IF response is within +/- 20% of source strength as determined for the source by a source calibration provider, PROCEED to Step 5.2.5.

5.2.4.2 IF response is not within +/- 20% of the mean or typical instrument response for that source,

OR

IF response is not within +/- 20% of source strength as determined for the source by a source calibration provider, PERFORM the following:

a. IF reading is high out-of-range, CONTACT the Instrument FPOC for evaluation for continued use.

b. IF the reading is low out-of-range or Instrument FPOC determines not acceptable for continued use, THEN:

1. TAG the instrument with a completed instrument service tag (BT-6002-880) identifying the problem(s).

2. SEGREGATE the instrument to prevent inadvertent use.

3. NOTIFY RadCon management.

c.

5.2.5 MULTIPLY instrument’s response by 0.8 and 1.2 to determine acceptable range for that instrument AND

RECORD the acceptable range on A-6002-895, Daily Instrument Source Check Log.

5.2.6 COMPLETE the remainder of the Daily Instrument Source Check Log (A-6002-895).

5.2.7 IF more than one range is being checked REPEAT Steps 5.2.1 through 5.2.4.
5.2 Source Check (Cont.)

5.2.8 IF initial response is acceptable, ATTACH AND COMPLETE a Daily Source Check (BL-6006-213) to the instrument.

5.2.9 IF the instrument fails the initial source check, TAG with a completed Instrument Service Tag AND PREPARE the instrument for pickup and servicing by the calibration service provider.

5.2.10 IF it is determined that the Instrument Service Tag was installed in error, PERFORM the following:

5.2.10.1 CONFIRM the instrument passes all required operational checks.

5.2.10.2 OBTAIN concurrence from the First Line Manager to place instrument back into service.

5.2.10.3 REMOVE the Instrument Service Tag.

5.2.10.4 PLACE the instrument back in service.
5.2 Source Check (Cont.)

**Daily Source Check**

5.2.11 Two machined grooves are located on the detector, **CENTER** the machined groove closest to the end of the detector over the source.

5.2.12 **SELECT** the appropriate source strength to achieve an on scale response **AND**

**ALLOW** the instrument’s reading to stabilize.

5.2.13 **CONFIRM** instrument's response falls within the acceptable range on the A-6002-895, Daily Instrument Source Check Log.

5.2.14 **IF** more than one range is being checked **REPEAT** Steps 5.2.11 through 5.2.13.

5.2.15 **IF** instrument response is within the acceptable ranges, **COMPLETE** the following:

- Daily Instrument Source Check Log (A-6002-895)
- Daily Source Check (BL-6006-213).

5.2.16 **IF** instrument failed source check, **TAG** with completed “Instrument Service Tag” **AND**

**PREPARE** the instrument for pickup for servicing by the calibration service provider.

5.2.17 **IF** it is determined that the Instrument Service Tag was installed in error, **PERFORM** the following:

5.2.17.1 **CONFIRM** the instrument passes all required operational checks.

5.2.17.2 **OBTAIN** concurrence from the First Line Manager to place instrument back into service.

5.2.17.3 **REMOVE** the Instrument Service Tag.

5.2.17.4 **PLACE** the instrument back in service.
5.3 Response Check

NOTE - Response checks should be performed periodically during continuous use.
- At a minimum, the instrument will be response checked each time it is turned on.

5.3.1 TURN selector switch to X.1 position (lowest range) AND
ALLOW a 10 second warm-up.

5.3.2 TURN audible response ON.

5.3.3 CONFIRM instrument has an audible response AND
CONFIRM upscale meter deflection to background radiation (a small but observable deflection).

5.3.4 IF instrument failed response check, TAG with completed “Instrument Service Tag” AND
PREPARE the instrument for pickup and servicing by the calibration service provider.

5.3.5 IF it is determined that the Instrument Service Tag was installed in error, PERFORM the following:

5.3.5.1 CONFIRM the instrument passes all required operational checks.

5.3.5.2 OBTAIN concurrence from the First Line Manager to place instrument back into service.

5.3.5.3 REMOVE the Instrument Service Tag.

5.3.5.4 PLACE the instrument back in service.
5.4 Operating Instructions

NOTE - The Xetex Telescan will respond to high energy beta radiation (e.g., SrY-90). No quantitative measurements or data recording should be made of beta radiation.

- The Xetex Telescan may be used for general area photon (gamma or x-ray) and contact reading for diameters five (5) inches or greater readings only. No contact correction factors have been established for diameters less than five (5) inches. Care must be used when making contact measurements to position the appropriate low range or high range tube over the center of the area being measured or the highest reading obtainable for a contact reading.

- The high range detector may be used for indication only readings unless a proper source check of the high range detector has been performed.

5.4.1 PERFORM Steps 5.1.1 through 5.1.6 prior to using the Xetex Telescan.

5.4.2 IF damage to the Xetex Telescan is suspected during survey (e.g., instrument is dropped), PERFORM either of the following steps:

NOTE - An established field value may be a previous reading or a well-known, constant, non-zero field.

5.4.2.1 IF an established field is available, ENSURE response is within ±20% of established value.

5.4.2.2 IF an established field is not available, PERFORM the Daily Source Check per Section 5.2.

CAUTION

Take care, when moving the instrument, not to hit the telescoping pole against other objects such as walls, poles, or light fixtures to prevent damaging the instrument.

NOTE - Rapid movement of the instrument can cause momentary measurement inaccuracy due to the effects of inertia on the meter indicating needle.

5.4.3 TURN the instrument’s selector switch to the highest range.
5.4 Operating Instructions (Cont.)

**WARNING**

Shock Hazard. When telescoping pole is extended, care should be taken to avoid contact with electrical hazards (e.g. overhead electrical lines) resulting in electrical shock injury or death.

5.4.4 MOVE the probe toward the source of radiation AND

SWITCH scale(s) ranges for radiation field being measured as necessary.

5.4.5 IF exposure rate exceeds the highest range of the low range detector and the high range detector must be used, **RESPONSE CHECK** the high range detector before attempting measurements.

5.4.6 **RESPONSE CHECK** the high range detector as follows:

5.4.6.1 CONFIRM an audible response AND

CONFIRM an upscale meter deflection to the radiation.

5.5 **Temperature Correction Factors**

NOTE - Temperature Correction Factors are used when the Xetex Telescan is used in an environment where the temperature is less than 0 °C (32 °F). The correction factors are given below.

5.5.1 IF Temperature is 14 to 32 °F (-10 to 0 °C), **MULTIPLY** Instrument Response by 1.2.

5.5.2 IF Temperature is 0 to 14 °F (-18 to -10 °C), **MULTIPLY** Instrument Response by 1.3.
5.6 Records

5.6.1 **PERFORM** the following for records identified within this procedure.

5.6.1.1 On the Records Submittal Checklist, **RECORD** the number of pages that were completed

**OR**

5.6.1.2 **ATTACH** the completed records to the Records Submittal Checklist **AND**

**SIGN** Records Submittal Checklist indicating the package is complete.

5.6.1.3 **SUBMIT** the completed records to an approved RadCon Record Storage Area for retention.

The record custodian identified in the Company Level Records Inventory and Disposition Schedule (RIDS), is responsible for record retention in accordance with TFC-BSM-IRM_DC-C-02.

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<thead>
<tr>
<th>Records Submittal Checklist</th>
<th>Number of pages completed</th>
<th>N/A (✓)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Form A-6002-895, Daily Instrument Source Check Log</td>
<td></td>
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________________________ / ______________________ / ______________
Signature
First Line Manager (or designee)

____________________________ / ______________________ / ______________
Print (First and Last Name)  Date
Operating the Xetex Telescan

Attachment 1 – Xetex Telescan Information Summary

A. The Xetex Telescan Extender survey instrument uses two energy-compensated Geiger-Mueller (GM) detectors to cover a wide range of exposure rate ranging through seven selectable ranges. The instrument features a selector switch with positions of OFF, Battery Check, and seven selectable ranges of 0-1; 0-10, 0-100, 0-1000 mR/h and 0-10; 0-100; 0-1000 R/h. Other features include light and audible switch positions.

B. The temperature range for the Xetex Telescan is given by the manufacturer as -0 °C to 40 °C (32 °F to 104 °F). Corrections are required if the instrument is used at temperatures below 0 °C (see Section 5.5, Temperature Correction Factors). The instrument is suitable for indoor or outdoor use.

C. Extendable survey instruments are not affected by temperature shocks. However, it is good practice to allow an instrument’s temperature to equalize with the ambient temperature before using it to perform surveys.

D. Take care when moving the instrument, not to hit the Telescoping pole against objects such as walls, poles, light fixtures, or above ground electrical wires.

E. If the instrument will be used in a damp or condensing environment, the probe should be sleeved in plastic. An example of a condition where condensation could be encountered is moving a cold instrument into a warm humid environment. Condensation (beads of water) may form on the instrument. The operator should allow the instruments to equalize with the ambient temperature and remove any remaining condensation. The survey instrument is not affected by changes in ambient pressures typically encountered on the Hanford Site.

F. Both detectors (high and low) on the Xetex Telescan respond within ±15% of the true exposure rate to photons from 70 keV to 1 MeV. The Xetex Telescan is used to measure dose rates in photon (x-ray and gamma) radiation fields only.

G. The Xetex Telescan responds to high-energy beta radiation energies. The beta response is proportional to field strength and does not accurately measure beta dose rate. This instrument may be used to detect the presence of beta but cannot be used to quantify beta dose rate, an ion chamber type such as the Eberline/Thermo Fisher RO-20 should be used to make beta dose rate measurements.

H. The Xetex Telescan does not respond to alpha or neutron radiations.

I. Battery life: The 4-C batteries, housed in the display unit handle, provide typically 400 hours of operation. The batteries in the detector assembly provide 80 hours of operation in a 100-R/hr field. These batteries will last roughly 350 hours when not measuring radiation.

J. Weight: 6.5 pounds including the batteries.

K. Length: 43.2 inches (3.6 feet) collapsed up to 169.2 inches (14.1 feet) fully extended.