

ADVANCED MEDICAL SYSTEMS OPERATING PROCEDURE

COUNTING INSTRUMENT CHECKS AND USAGE

ISP-3 Rev. 01/95

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1.0 PURPOSE: To provide a standard guide for performing daily checks and usage of counting instruments.

2.0 PRECAUTIONS AND LIMITATIONS:

2.1 Daily checks are to be performed prior to first use of counting instruments each day.

2.2 Use appropriate care when handling reference standard sources.

3.0 INSTRUCTIONS:

3.1 Daily Checks.

3.1.1 Turn instrument on and allow at least a fifteen (15) minute warm up period.

3.1.2 Count background for twenty (20) minutes with a clean sample holder in place and determine the background cpm (counts/20). Record the background cpm in the BKG CPM block on Form ISP-4A.

NOTE: Well counter background should be less than 30 cpm. Scalar background should be less than 45 cpm. A higher background indicates the possibility of a contaminated probe or undesirable source of radiation nearby. Correct as necessary.

Prepared by: Robert Meschter

Approved by: *R Meschter*

Date: 1-24-95

- 3.1.3 Count the reference standard for five (5) minutes and determine source cpm. Record the source cpm and the instrument settings on Form ISP-4A.
- 3.1.4 Compare the source cpm to the calculated values of the source provided for the month. An acceptable range of +/-10% is given. If the source counts are not within the limits, notify the RSO and adjust the instrument according to the manufacturers specifications.
- 3.1.5 Calculate the Minimum Detectable Counts (MDC). Record the MDC in the MDC block provided on Form ISP-4A.

$$MDC = 2.71 + 3.29 \times \left(\frac{Cb}{Tb} + \frac{Cb}{Ts} \right)$$

Cb = Background cpm
 Tb = Background count time
 Ts = Sample count time

3.2 Counting Samples

- 3.2.1 Ensure all checks described in Section 3.1 have been satisfactorily completed prior to use.
- 3.2.2 Smear samples.
 - a. Place smear in vial (well counter) or planchette (scalar) and count for one (1) minute.
 - b. Determine activity as follows:

$$dpm = \frac{(\text{sample cpm}) - (\text{background cpm})}{(C_{eff})}$$

The counter efficiency (C_{eff}) is posted on the calibration sticker.
- 3.2.3 Air samples (taken in accordance with ISP-10).
 - a. Place sample filter face up in planchette and count for five (5) minutes. Determine sample cpm.

b. Determine activity as follows.

If cfm is used, convert to milliliters

$$\text{sample volume} = \frac{\text{flow rate (cfm)} \times \text{time (min.)}}{2.83 \times 10^4 \text{ (conversion factor)}}$$

$$\text{uCi/ml} = \frac{(\text{sample cpm}) - (\text{bkg cpm})}{(\text{sample volume})(2.22 \times 10^6)(C_{\text{eff}})}$$

* If (sample cpm) - (bkg cpm) is less than the Minimum Detectable Counts (MDC), than use the MDC in its place.

NOTE: The MDC is located on the Daily Instrument Checklist, Form ISP-4A.

3.3 Submit completed Form ISP-4A to the RSO for review.

DAILY INSTRUMENT CHECKLIST

ISP-3A

INSTRUMENT: _____ SER#: _____ EFF.: _____ CAL DUE: _____

[illegible]

1. Count background for 20 minutes.
2. Count source for 5 minutes.
3. Note H.V. setting for MS-3 / Peak Energy for Spectrosalar.

Performed by: _____ Date: _____

Reviewed by RSO: _____ Date: _____