

10110.1REV1 NVCM 060890

REVISION 01 06/08/90

OPI: S&T/CD

DATA REPORTING FOR NONVALIDATED
CHEMICAL METHODS (NVCM)

I. PURPOSE

This directive prescribes policy concerning the reporting of analytical values for compounds where the analytical method (or methods) has not met Agency requirements for validation or collaboration by a multi-laboratory study or has not been submitted for study. This Directive also identifies analyst and supervisory responsibilities in reporting data when using NVCM's.

II. CANCELLATION

Cancel FSIS Directive 10,110.1, dated 5-14-86.

III. REASON FOR REISSUANCE

The Attachment has been revised extensively and methods are now listed in alphabetical order.

IV. REFERENCES

Method E691, paragraph 16.8.3; American Society for Testing Materials Grubbs' Test, in Hawkins, D.M., Identification of Outliers (New York: Chapman and Hall, 1980), Appendices I and II, pp. 136-143.

V. ABBREVIATIONS

The following will appear in their shortened form in this Directive:

CD	Chemistry Division, Science and Technology
CV	Coefficient of Variation
MPL	Minimum Proficiency Level
NVCM	Nonvalidated Chemical Method
PPB	Parts Per Billion
PPM	Parts Per Million
S&T	Science and Technology
SRV	Sensitivity Rounding Value for the Analyte
TSL	Technical Support Laboratories
X	Analyte Concentration of Interest

VI. POLICY

A. This Directive identifies FSIS's system for reporting analytical values for compounds where the method or methods have not been fully or successfully validated or where a multi-laboratory study is not warranted.

S&T has accepted the use of NVCM's to conduct the various programs for the analysis of drugs, pesticides, and other chemicals in meat and poultry products.

B. There are three chief advantages to using NVCM's. First, NVCM's are available on a short turn-around basis. Second, the costs of their implementation are substantially less than those associated with validated or collaboratively studied methods. Third, changes can be introduced in NVCM's to improve productivity and performance without the requirement to repeat validation studies.

VII. DEFINITION

Nonvalidated Chemical Method. An analytical procedure which (1) has not been validated in a multi-laboratory study by at least three independent analysts with a minimum of two laboratories, or (2) was subjected to a multi-laboratory study at an analyte concentration above the residue limit or (3) the determined MPL is higher than the established residue limit. This definition does not apply to validated or collaborated analytical chemical methods extended to other species and tissues by study or to analytical methods primarily used as screens to detect the presence of an analyte. However, procedures for extending analytical methods to other species and tissues for use in only one laboratory are the same as described in this Directive.

VIII. REQUIREMENTS

A. New NVCM'S. To establish an analytical chemical method not already listed in this Directive as a NVCM, the following criteria will be applied to determine linearity and repeatability using fortified tissues.

1. To determine linearity, use external analyte standards at 4 nominal concentrations, 0 X, 1/2 X, X and 2 X, on three separate days. A minimum linear correlation coefficient value (r) of 0.9995 is required.

2. A minimum of 20 data points are required based on 5 replicates per set of 4 concentration levels. Fortification concentrations are a 0 X, 1/2 X, X and 2 X in the species and tissue of interest. The recoveries and CV for repeatability for fortified tissues are to meet the CD guidelines for acceptability issued November 2, 1983, summarized as follows:

Analyte Concentration	CV Repeatability	Recovery
0.1 to 10 PPM	< 15 percent	80-110 percent
	—	
1 to 100 PPB	< 20 percent	60-115 percent
	—	
< 1 PPB	< 35 percent	40-120 percent
—	—	

3. The above referenced 20 data points must be composed of at least two sets of samples prepared on different days. Replicate set analyses within day is acceptable if analysis time permits.

B. Multiple Species-Tissues. Analytical data for the additional species or tissues requires a minimum of 12 additional data points, i.e., the four nominal concentrations in triplicate, either within day or between days. If X changes for different species or between tissues, this provision does not apply.

C. NVCM'S in Use.

1. The NVCM'S and respective applicable species/tissues are listed in Attachment 1.

2. Additional analytical methods given the status of NVCM will be initially appended in protocols, studies, or other instruments. The intent, scope and use of the NVCM will be stated, to be followed by an amendment to this Directive which adds the new NVCM to the listing at Attachment 1.

3. Current NVCM's which have subsequently met the criteria for a validated or collaborated analytical method will be deleted by amendment to Attachment 1.

IX. ACCEPTABILITY/RESPONSIBILITIES

A. Evaluation of Analytical Data Acceptability for Reporting

1. The analyst(s) are to perform the assays on species/tissues designated by CD, with duplicate analyses for all positives. The difference (D) in the two values to the nearest SRV should be equal to or less than the product determined by the following equation:

$$D < X \frac{CV}{2.0} \sqrt{\frac{2}{2}}$$

100

Where: CV for each method is prescribed in Attachment 1.

X is the sample mean,

2.0 represents the 95 percent confidence interval based on ASTM Reference, and

2 is the number of determinations.

If this criterion is not met, the analysis is to be repeated twice, subjecting the repeat values to the equation in subparagraph IX.A.1.

2. If the criterion for data acceptability for the first or second set of duplicate values is not met in subparagraph IX.A.1., repeat the

analysis again in duplicate, and calculate the CV using all six values. The CV must be equal to or less than the CV listed at Attachment 1. If the criterion still remains unsatisfied, repeat the analyses, add two additional values and then test the data for outliers at the 1 percent level using Grubbs' test. For reporting analytical values using this section, the CV must be based on a minimum of six values in order to report a mean.

B. Reporting of Data.

1. The SRV is the first nonsignificant unit of measurement and serves as an estimation value for calculating a single analytical value as part of a series of multiple determinations. The mean is calculated by summing the analytical values for each determination including the SRV last estimate and then dividing by the number of determinations. For the case described in subparagraph IX.A.1., the analyst reports the mean of the two acceptable values rounding the analytical value to one significant figure less than the SRV. Example: If the SRV is 0.01 PPM, then the mean is reported to the nearest 0.1 PPM. For analytical values ten times greater than the initial analytical data base for evaluation, increase the SRV by a factor of ten, and report the mean to one significant figure less than the revised SRV. For analytical values which are additional orders of magnitude, e.g., 100 or 1000 times above the initial data base, the same format is followed.

2. For the case described in subparagraph IX.A.2., the analyst reports the mean of all analyses performed, rounding the analytical value to one significant figure less than the SRV.

D. Supervisory Review.

1. The responsible TSL supervisor shall review all instrument recordings, laboratory notebooks, analytical calculations, statistical data, and any other pertinent documents prior to reporting data on FSIS analysis forms.

2. The CD Staff reviews all data generated in establishing an analytical method as a NVCM.

Marvin A. Norcross
Deputy Administrator
Science and Technology

Attachment

Table of Nonvalidated Chemical Methods

FSIS DIRECTIVE 10,110.1
REVISION 1
ATTACHMENT 1

TABLE OF NON-VALIDATED CHEMICAL METHODS

Symbol Codes for Tissues:

F=fat L=liver
K=kidney M=muscle

Method	Reference	Expected Repeatability CV(%)	SRV	Species/Tissues
Anabolics (ANA) (DES, Zeranol, and Taleranol)	Chem Lab Guidebook 5.051	20 (DES) 25 (ZER & TAL) ^a	0.001 PPB	Bovine/L, K, M
Arsenic & Tin (ASN) (Atomic Absorption)	Chem Lab Guidebook 5.009	25	0.01 PPM	All/L, K, M (As) turkey/L&M (Sn)
Benzimidazoles (BNZ) (albendazole sulfone, metabolite) cambendazole, fenbendazole, oxfendazole, mebendazole, thiabendazole and 5-hydroxymetabolite)	Midwestern Lab-1989	20	0.01 PPM L&M	Red meat species/ b carbendazim (benomyl)
Carbamates (CBM) (aldicarb, aldicarb sulfoxide, aldicarb sulfone, carbaryl, carbofuran, hydroxycarbofuran, methiocarb and sulfoxide, bufencarb,	Eastern Lab-1989	30	0.1 PPB	All/L&M

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methomyl,				--

bendiocarb, propoxur,
oxamyl, dioxacarb,
isoprocarb, and
promecarb)

Chloramphenicol (CAM)	Midwestern Lab-1989	25	0.01 PPB	Swine/Bovine/M
Clopidol (CLP)	JAOAC 67(2), 344 1984	12	0.1 PPM	Poultry/L&M
Decoquate (DCQ)	Eastern Lab	20	0.01 PPM	Poultry/L&M
Dibutyltin dilaurate	Eastern Lab-1989	20	0.01 PPM	Poultry/L&M
Levamisole (LVM)	Chem Lab Guidebook 5.033	15	0.001 PPM	All Red Meat/L&M
Morantel/Pyrantel	Chem Lab-1989 Guidebook 5.046	20	0.01 PPM	Bovine & C Swine/M
Novobiocin (NVB) & (NBV)	Eastern Lab-1989 (Manual & Robotics Methods)	15	0.01 PPM	Red Meat/L&M

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Nitromidazoles (NTZ)	Midwestern Lab-1989	35	0.01 PPB Turkey & Swine/M
Organophosphates (ORP) (dichlorvos, ruelene, guthion and coumaphos (O))	Chem Lab Guidebook 5.006	20	0.01 PPM All/L&M
Pyrethroids (PYR)	Eastern	20	0.01 PPM All/F (permethrin,

Lab-1989 cypermethrin, deltamethrin, fenvalerate, flucythrinate)	(1 PPB for cypermethrin)
Triazines (chlorinated) (TRZ)	Eastern 20 Lab-1989 Replacement Chem Lab Guidebook 5.032 and Western 20 Lab-1990 Gel Permeation
	0.1 PPB All/F
	0.1 PPB All/F

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Tylosin (TYL)	ARS-Moats Methods	20	0.01 ppm Bovine/M
Virginiamycin (NBV)	Eastern Lab-1989	20	0.01 ppm Red Meat /L&M

a - Passed at least 3-analyst, 2-laboratory validation study for part of the method.

b - For carbendazim, analysis applies to poultry as well.

c - Liver method passed a 3-laboratory study for new animal drug application.