Proficiency Analytical Testing (PAT) Program November 29, 1997

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PAT ROUND 131 OCTOBER 1997

A total of 1246 laboratories were enrolled in the PAT Program with 1103 laboratories submitting results on Round 131. Table I lists the reference values, performance limits, and participants for each sample type in the PAT Program. Table II presents the summary of the PAT proficiency ratings for each analytical area.

PAT ROUND 132 JANUARY 1998

PAT Round 132 was sent to participating laboratories on December 24, 1997. In the PAT program, the organic solvents were benzene, o-xylene, and toluene. Metals in this round included cadmium, chromium, and lead. Silica had a talc and coal background, and asbestos/fibers were amosite with one man-made fiber sample.

BACKGROUND

The Proficiency Analytical Testing (PAT) Program is a collaborative effort of the American Industrial Hygiene Association (AIHA) and researchers at the Centers for Disease Control and Prevention (CDC), National Institute for Occupational Safety and Health (NIOSH). The PAT Program provides quality control reference samples to more than 1200 occupational health and environmental laboratories in 17 countries. Although one objective of the PAT Program is to evaluate the analytical ability of participating laboratories, the primary objective is to assist these laboratories in improving their laboratory performance.

Each calendar quarter (designated as a round), samples are mailed to participating laboratories, and the data are analyzed to evaluate laboratory performance on a series of analyses. Each mailing and subsequent data analysis is completed in time for participants to obtain repeat samples and to correct analytical problems before the next calendar quarter starts. The PAT Program currently includes four sets of samples as shown in Table III. A mixture of 3 of the 4 possible metals, and 1 to 3 of the 15 possible organic solvents, are rotated for each round. Fibers alternate between amosite and chrysotile asbestos and man-made fibers; no fiber mixtures are provided. Each set consists of four concentrations and a blank. The metals, silica, and fibers samples are on filters, and the organic solvents are on charcoal, carbon molecular sieve, or silica gel tubes. The organic solvent set also includes five blank charcoal, carbon molecular sieve, or silica gel tubes for desorption efficiency determination.

Laboratories are evaluated for each analysis by comparing their reported results against an acceptable performance limit for each PAT Program sample the laboratory analyzes. Reference laboratories are preselected to provide the performance limits for each sample. These reference laboratories must meet the following criteria: (1) the laboratory was rated proficient in the last PAT evaluation of all the contaminants in the program; and (2) the laboratory, if located in the United States, is AIHA accredited. After the data

TABLE I. Reference Values, Performance Limits, and Participants for Each Sample Type; PAT Round 131 (October 1997)

Contaminant	Sample Number	No. of Reference Labs	Reference Value	RSD (%)	Performance Limits		No. of Labs	No. of Outliers
					Lower	Upper		
Cadmium (mg)	1	54	0.0171	5.0	0.0146	0.0197	317	18
	2	54	0.0058	5.1	0.0049	0.0066	317	23
	3	54	0.0170	4.6	0.0147	0.0194	317	23
	4	54	0.0025	6.5	0.0020	0.0029	317	24
Lead (mg)	1	54	0.0225	4.3	0.0196	0.0254	320	37
	2	54	0.0494	3.7	0.0439	0.0549	320	38
	3	54	0.0524	4.2	0.0459	0.0589	320	31
	4	54	0.0898	4.6	0.0775	0.1021	320	24
Zinc (mg)	1	54	0.0491	4.7	0.0421	0.0561	316	36
	2	54	0.0783	4.0	0.0688	0.0877	316	37
	3	54	0.1464	3.8	0.1295	0.1632	316	42
	4	54	0.1077	4.6	0.0930	0.1224	316	30
Silica (mg)	1	54	0.0502	33.3	0.0001	0.1002	73	2
	2	54	0.0750	21.7	0.0261	0.1240	73	4
	3	54	0.1064	19.5	0.0443	0.1685	73	3
	4	54	0.1106	21.4	0.0396	0.1815	73	2
Asbestos/Fibers (Chrysotile) (f/mm²)	1	54	183	29.0	63	367	948	63
	2	54	71	26.4	26	138	948	37
	3	54	132	27.1	45	264	948	79
	4	54	230	29.9	75	469	948	56
Methanol (mg)	1	54	0.2163	5.0	0.1836	0.2490	288	28
	2	54	0.3641	5.4	0.3053	0.4228	288	19
	3	54	0.5478	9.4	0.3931	0.7024	288	22
	4	54	0.1318	7.6	0.1018	0.1619	288	30

TABLE II. PAT Proficiency Ratings Based on Rounds 128 to 131 (January 1997–December 1997)

Contaminent	No. of Labs Rated	No. of Labs Rated Proficient	Percent Labs Rated Proficient
Metals	317	292	92.1
Silica	74	73	98.7
Asbestos/fibers	949	908	95.7
Organic solvents	290	268	92.4

TABLE III. Current Sets of Samples in the PAT Program

Metals	cadmium	
	chromium	
	lead	
	zinc	
Silica	quartz	
Asbestos/fibers	amosite	
	chrysotile	
	man-made fibers	
Organic solvents	benzene	methyl ethyl ketone
	n-butyl acetate	methyl isobutyl ketone
		tetrachloroethylene
	chloroform	toluene
	1,2-dichloroethane	1,1,1-trichloroethane
	p-dioxane	trichloroethylene
	ethyl acetate	o-xylene
	isopropanol	
	methanol	

from the reference laboratories are collected and statistically treated, the mean of the collected data is called the reference value and the performance limits equal the mean ±3 standard deviations. Data are acceptable if they fall within the performance limits. Data falling outside the performance limits are reported as outliers.

Laboratories are rated based on performance in the PAT Program over the last year (i.e., four calendar quarters), as well as on individual contaminant performance. Individual contaminants are metals, silica, asbestos/fibers, and organic solvents. Individual contaminant performance is rated as (1) proficient if all results have been reported and all are classified as acceptable for the last two consecutive rounds; and (2) proficient in all other cases if three-fourths or more of the results reported in the last four consecutive rounds are classified as acceptable.[1]

References

1. Esche, C.A., J.H. Groff, P.C. Schlecht, and S.A. Shulman: *Laboratory Evaluations and Performance Reports for the Proficiency Analytical Testing (PAT) and Environmental Lead Proficiency Analytical Testing (ELPAT) Programs* (DHHS/NIOSH no. 95-104). Cincinnati, OH: National Institute for Occupational Safety and Health, 1994.