United States Department of the Interior

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IN REPLY REFER TO:

NATIONAL WATER QUALITY LABORATORY TECHNICAL MEMORANDUM 2000.04S

Subject: Hach Turbidimeter 2100AN to replace Hach Turbidimeter 2100A for determination of turbidity in raw unfiltered water.

Effective Date of change: October 1, 2000

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Supplemental: This technical memorandum contains supplementary information for NWQL Technical Memorandum 2000.04

DOCUMENTATION OF INSTRUMENT COMPARISON

The following documentation compares the Hach 2100A and Hach 2100AN instruments for the measurement of turbidity in water.

Both instruments were checked against primary formazin standards and purchased reference samples and produced equivalent accurate results as shown in figure 1.

Differences for actual samples analyzed by the two instruments are shown in figure 2. These differences are primarily due to changes in the optical system of the 2100AN. The Hach 2100AN was designed to measure turbidity accurately despite the presence of color. The previous instrument (Hach 2100A) frequently reported turbidity values that were biased low. Dissolved substances that produce color (which absorbs light) caused this bias.

A primary formazin standard (58 NTU) was spiked with varying amounts of IHSS Nordic Aquatic fulvic acid obtained from the National Research Program to assess the difference in the two instruments when measuring turbidity in the presence of color. The same cell and solutions were used for all the measurements. (See table 1 and figure 3.)

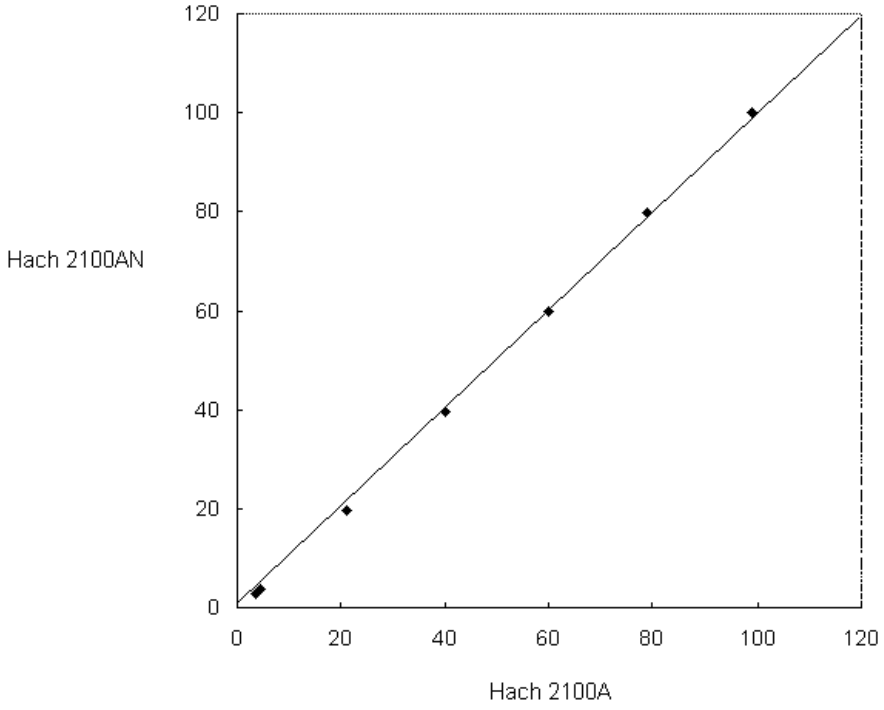

Figure 1. Primary formazin standards and purchased reference samples measured by Hach 2100A and Hach 2100AN.

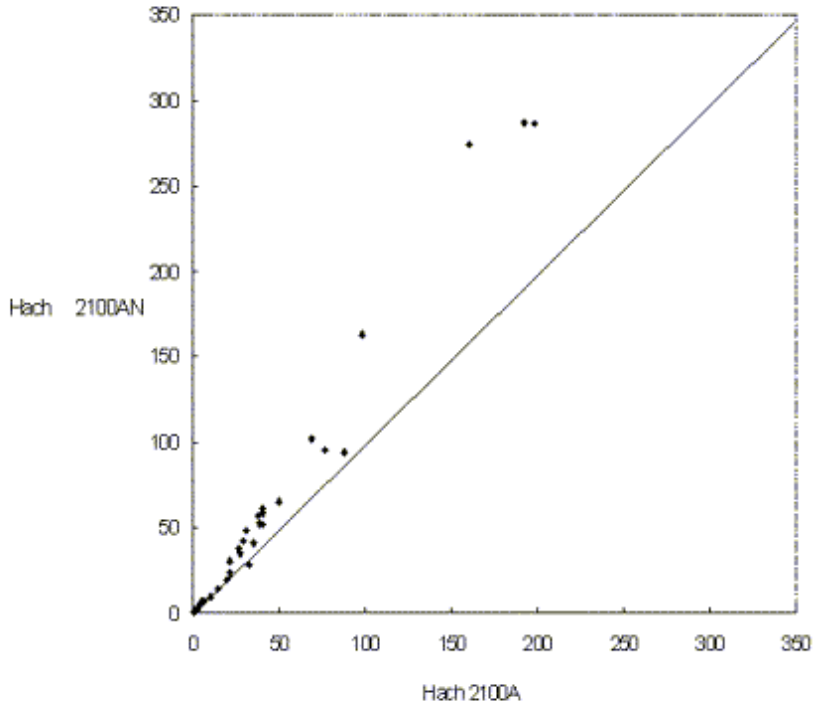

Figure 2. Values for actual samples measured on both Hach instruments.

Table 1. Comparison of the two instruments when measuring 58 NTU primary formazin standard spiked with IHSS Nordic Aquatic fulvic acid.

[mg/L, milligrams per liter; NTU, nephelometric turbidity units]

	Hach 2100A	% change	Hach 2100AN	% change
Primary + 0 fulvic acid	58 NTU		57.8 NTU	
Primary + 15 mg/L fulvic acid	52 NTU	10.3	58.7 NTU	-1.5
Primary + 30 mg/L fulvic acid	50 NTU	13.8	57.5 NTU	0.5
Primary + 45 mg/L fulvic acid	45 NTU	22.4	56.0 NTU	3.1
Primary + 60 mg/L fulvic acid	42 NTU	27.6	55.2 NTU	4.4

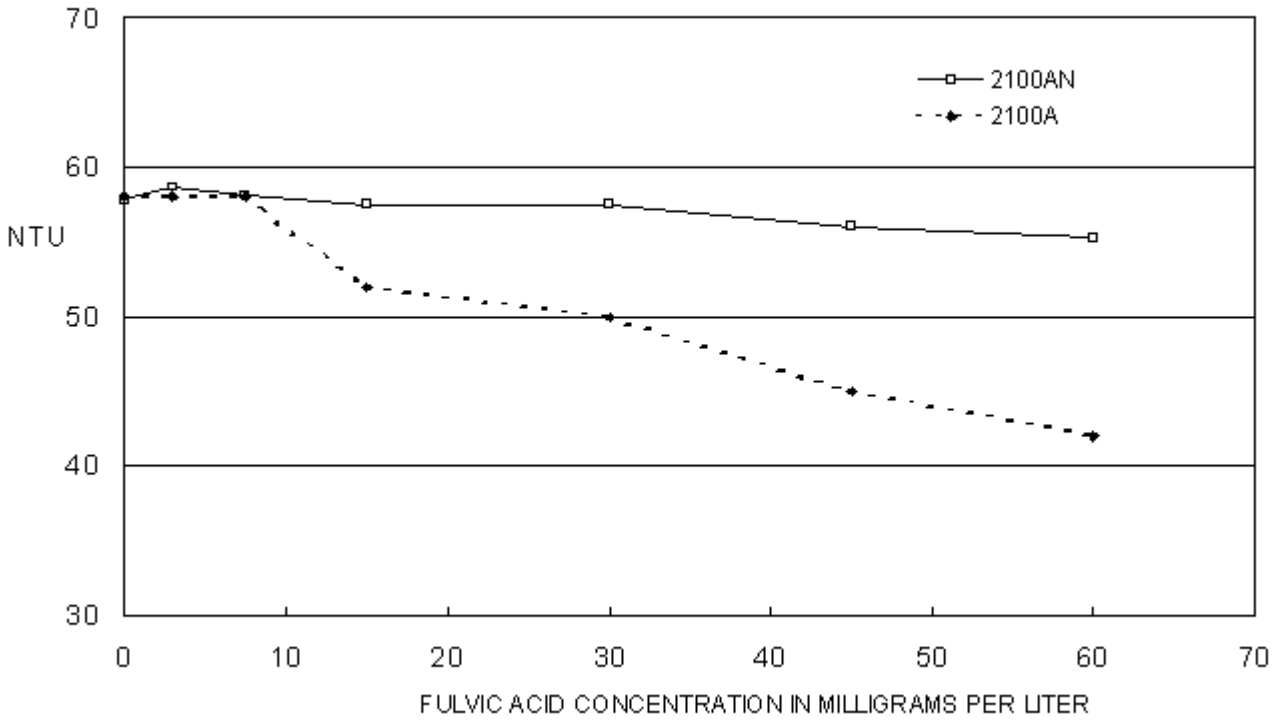

Figure 3. Change in turbidity measurements for 58 NTU formazin standard with varying amounts of IHSS Nordic Aquatic fulvic acid added.

//signed//

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