METHOD #: 213.1		Approved for NPDES and SDWA (Editorial Revision 1974)
TITLE:		Cadmium (AA, Direct Aspiration)
ANALYTE:		CAS Cd Cadmium 7440-43-9
INSTRUMENTATION:		AA
STORET No.	Total	01027
	Dissolved	01025
	Suspended	01026
Optimum Concentration Range:		0.05-2 mg/L using a wavelength of 228.8 nm
Sensitivity:		0.025 mg/L
Detection Limit:		0.005 mg/L

1.0 Preparation of Standard Solution

1.1 Stock Solution: Carefully weigh 2.282 g of cadmium sulfate ($3CdSO_4 \bullet 8H_2O$, analytical reagent grade) and dissolve in deionized distilled water make up to 1 liter with deionized distilled water. 1 mL = 1 mg Cd (1000 mg/L).

1.2 Prepare dilutions of the stock solution to be used as calibration standards at the time of analysis. The calibration standards should be prepared using the same type of acid and at the same concentration as will result in the sample to be analyzed either directly or after processing.

2.0 Sample Preservation

2.1. For sample handling and preservation, see part 4.1 of the Atomic Absorption Methods section of this manual.

3.0 Sample Preparation

3.1 The procedures for preparation of the sample as given in parts 4.1.1 through 4.1.4 of the Atomic Absorption Methods section of this manual have been found to be satisfactory.

4.0 Instrumental Parameters (General)

4.1 Cadmium hollow cathode lamp
4.2 Wavelength: 228.8 nm
4.3 Fuel: Acetylene
4.4 Oxidant: Air
4.5 Type of flame: Oxidizing

5.0 Analysis Procedure

5.1 For analysis procedure and calculation, see "Direct Aspiration", part 9.1 of the Atomic Absorption Methods section of this manual.

6.0 Notes

6.1 For levels of cadmium below 20 μg/L, either the Special Extraction Procedure given in Part 9.2 of the Atomic Absorption methods section as the furnace technique, Method 213.2 is recommended.

6.2 Data to be entered into STORET must be reported as μg/L.

6.3 For quality control requirements and optional recommendations for use in drinking water analyses, see part 10 of the Atomic Absorption Methods section of this manual.

7.0 Precision and Accuracy

7.1 An interlaboratory study on trace metal analyses by atomic absorption was conducted by the Quality Assurance and Laboratory Evaluation Branch of EMSL. Six synthetic concentrates containing varying levels of aluminum, cadmium, chromium, copper, iron, manganese, lead and zinc were added to natural water samples. The statistical results for cadmium were as follows:

Number of Labs	True Values μg/Liter	Mean Value μg/Liter	Standard Deviation μg/Liter	Accuracy as % Bias
74	71	70	21	-2.2
73	78	74	18	-5.7
63	14	16.8	11.0	19.8
68	18	18.3	10.3	1.9
55	1.4	3.3	5.0	135
51	2.8	2.9	2.8	4.7