WEST VALLEY NUCLEAR SERVICES CO., INC.

ANALYTICAL CHEMISTRY METHOD
ANALYTICAL AND PROCESS CHEMISTRY

ACM-SS-1101, Rev. 1
Effective Date: 06/28/89

SOLIDSs, NONFILTERABLE (SUSPENDED)

Approved by:

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Analytical Chemistry

Part I

1.0 PURPOSE

1.1 To establish an analytical method to determine nonfilterable (suspended) solids on water samples.

2.0 APPLICATION

2.1 This method is applicable to surface waters, domestic and industrial wastes, and saline waters.

2.2 The practical range of the determination is 20 mg/l to 20,000 mg/l.

3.0 DISCUSSION

> 3.1 A well-mixed sample is filtered through a nylon membrane fiber filter and the residue retained on the filter is dried to constant weight at 103 - 105°C.

3.2 Sample Handling and Preservation

3.2.1 Nonhomogenous particulates should be excluded from the sample.

3.2.2 Preservation of the sample is not practical; analysis should begin as soon as possible.

3.3 Interferences

3.3.1 Because excessive residue on the filter may entrap water and extend drying time, a sample volume that will yield between 2.5 mg and 200 mg total nonfilterable residue should be used for the analysis.

3.4 Definitions

> 3.4.1 Nonfilterable solids are defined as those solids which are retained by a nylon membrane filter and dried to constant weight at 103 - 105°C.

4.0 REFERENCES

4.1 Standard Methods for the Examination of Water and Waste Water, 16th edition. 209C Total Suspended Solids Dried at 103 - 105°C.

4.2 EPA, "Methods for Chemical Analysis of Water and Wastes," EPA-600/4-79-020."

Part II

>5.0 EQUIPMENT

> 5.1 Nylon membrane filter, 0.45um, 47 mm or equivalent.

5.2 Suction flask, 500 ml capacity.

5.3 Filter holder.

5.4 Drying oven, for operation at 103° - 105°C.

5.5 Desiccator.

5.6 Analytical balance, 200 g capacity, capable of weighing to 0.1 mg.

5.7 Graduated cylinders, 100 ml, 250 ml, and 500 ml.

> 5.8 Aluminum Planchets

> 5.9 Tweezers

> 5.10 Glass Petri Dishes (in cell use)

> 5.11 60 mL bottles (in cell use)

6.0 REAGENTS AND STANDARDS

Not Applicable

7.0 SAFETY PRECAUTIONS

7.1 While performing analysis, lab coat, and safety glasses are required.

8.0 RECORDS

8.1 All measurement data and sample identification shall be recorded on the worksheet (Attachment A). The final result shall be recorded on the analytical request sheet.

9.0 CALIBRATION AND CONTROL

9.1 All balances used shall be calibrated on a daily basis.

9.2 No statement can be made concerning the precision of this method. The precision is influenced by both the nature and the amount of entrained matter and by the effects of drying and ignition on its actual composition.

10.0 PROCEDURE

> 10.1 Preparation of Nylon Membrane Filter: Store in desiccator at least one hour prior to using. Weigh immediately before use.

> 10.1.1 In Cell: Place Nylon Membrane Filter in a uniquely labled petri dish. The initial weight obtained from filter and petri dish is used for the dry weight of the filter in grams.

> 10.2 As a practical limit, choose a well mixed sample volume that will give a final result in the range of 2.5 mg and 200 mg total nonfilterable residue. The amount of sample must be determined by weight. For example at the present time 0.5 g aliquot is adequate for melter feed, where SBS samples require a 25 g aliquot. Filter sample in a previously weighed filter, under vacuum. Wash filter with three successive 10 mL portions of distilled water. Remove filter from filter apparatus. Transfer to an aluminum planchet as a support. Dry the filter at least one hour at 103°-105°C. Note: Feed and SBS samples require only fifteen minutes of dry time. Cool filter in a desiccator to balance temperature for a minimum of ten minutes and weigh. Reheat and reweigh samples to a constant weight unless otherwise documented to the contrary.

> 10.2.1 In cell: Weigh a uniquely labeled 60 mL composite bottle; add three vials of supernatant sample to this composite bottle. Weigh bottle with sample. Sample size is weight of bottle and sample minus weight of composite bottle. Rinse 60 mL bottle and suction flask with distilled water. Remove filter from filter apparatus. Transfer filter to the same petri dish in which it was weighed initially. Place petri dish and filter in oven for one hour set at 103° - 105°C.

11.0 CALCULATIONS

11.1 Total nonfilterable residue (suspended solids):

>

$$\% \text{ Suspended Solids} = \frac{(A - B)}{C} \times 100$$

> A = weight of filter + residue (g)
> B = weight of filter (g).
> C = weight of sample (g).

> 11.2 In-cell total nonfilterable residue (suspended solids):

$$\text{ppm} = \frac{(A - B)}{\text{Sample Size (g)}}$$

A = weight of filter and residue (in μg)
B = weight of filter (in μg)

12.0 ATTACHMENT

ATTACHMENT A - Suspended Solids Worksheet

ATTACHMENT A

Page __ of __

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% SUSPENDED SOLIDS

SAMPLE NAME _____ LOG NUMBER _____

SPECIAL INSTRUCTIONS _____

_____

_____

INSTRUMENTS USED: _____

SAMPLE ID				
C = SAMPLE WEIGHT (G)				
B = DRY FILTER (G)				
A = FILTER + SAMPLE(G)				
% SUSPENDED SOLIDS = $\frac{A-B}{C} \times 100$				

ANALYST _____ DATE _____

APPROVED _____ DATE _____

ATTACHMENT B

CELL SUSPENDED SOLIDS WORKSHEET

Sample Name _____ Log Number _____

Special
Instructions _____

_____

INSTRUMENTS USED: _____

>

SAMPLE ID			
COMPOSITE BOTTLE EMPTY (g)			
BOTTLE AND SAMPLE (g)			
SAMPLE WEIGHT (g) C			
DRY FILTER (μg) B			
DRY FILTER & RESIDUE (μg) A			
SUSPENDED SOLIDS (ppm)			

$$\text{SUSPENDED SOLIDS (ppm)} = \frac{A - B}{C}$$