

April 9, 2007
L-07-058

Pennsylvania Department of Environmental Protection
Bureau of Laboratories
Attn: Richard Sheibley, Chief, Laboratory Accreditation Program
P.O. Box 1467
Harrisburg, PA 17105-1467

Beaver Valley Power Station USEPA Methods Update Rule

To Whom It May Concern:

This letter is to request a change in method that was submitted in the Application for Laboratory Accreditation on July 27, 2006, to the Pennsylvania Department of Environmental Protection, Bureau of Laboratories, Laboratory Accreditation Program. Beaver Valley Power Station has revised its approved method for Total Suspended Solids in accordance with the Methods Update Rule. A copy of the revised Standard Operating Procedure, 1/2-CHM-ANA-4.63, Rev. 3, is attached for your review.

Name of Lab: Beaver Valley Power Station
Interim Lab Number: 4-2742
Parameter with Method Change: Residue - nonfilterable (TSS); mg/L
Former Method: EPA Method 160.2
MUR Method: SM 2540 D [20th edition]
Updated SOP: 1/2-CHM-ANA-4.63, Rev. 3

Should you have any questions regarding this matter, please direct them to the laboratory supervisors identified in the application or to Mr. Michael Banko, at 724-682-4117.

Sincerely,



Peter P. Sena
Director, Site Operations

Attachment (1)

(NOTE: No new US NRC commitments are contained in this letter.)

cc: Document Control Desk US NRC
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Central File: **Keyword - Laboratory Accreditation**

A001
B001

Beaver Valley Power Station

Unit 1/2

1/2-CHM-ANA-4.63

TOTAL SUSPENDED SOLIDS (TSS) - FOR NPDES APPLICATIONS

Document Owner

Manager, Nuclear Environmental and Chemistry

Revision Number	3
Level Of Use	General Skill Reference
Safety Related Procedure	No
Effective Date	

Beaver Valley Power Station

Procedure Number:
1/2-CHM-ANA-4.63

Title:
TOTAL SUSPENDED SOLIDS (TSS) - FOR NPDES
APPLICATIONS

Unit: 1/2	Level Of Use: General Skill Reference
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Beaver Valley Power Station

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1/2-CHM-ANA-4.63

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TOTAL SUSPENDED SOLIDS (TSS) - FOR NPDES
APPLICATIONS

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1.0 PURPOSE

1.1 This procedure provides instructions for the determination of total suspended solids (TSS).

2.0 SCOPE

2.1 TSS is defined as the retained materials on a standard glass fiber filter after filtration of a well-mixed sample. The solids are dried to a constant weight at 103 – 105 °C.

2.2 This procedure is applicable to the determination of TSS in water and wastewater. This procedure is also applicable to the analysis of TSS for samples required for NPDES permit compliance.

3.0 REFERENCES AND COMMITMENTS

3.1 References

3.1.1 Standard Methods For the Examination of Water and Wastewater, 20th Edition, 1999, Method 2540 D.

3.2 Commitments

3.2.1 Corrective Action 01-8348-2 incorporates the use of calibrated thermometer to monitor the temperature of the drying oven, and use of a quality control (QC) check standard to verify the accuracy of the analytical determination of TSS. ^(C1)

4.0 RECORDS AND FORMS

4.1 Records

4.1.1 Analysis results shall be recorded in the Chemistry Data Management (CDM) system.

4.1.2 Analytical balance used for TSS determination shall be recorded in CDM.

4.2 Forms

4.2.1 None.

5.0 PRECAUTIONS AND LIMITATIONS

5.1 Precautions

5.1.1 Lab coat, eye protection and appropriate gloves shall be worn when performing the analysis.

5.2 Limitations

5.2.1 A TSS QC Check Standard shall be analyzed AND determined to meet acceptance criteria prior to performing any sample analysis.

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<p>5.2.2 Do <u>NOT</u> collect less than 2.5 mg <u>OR</u> greater than 200 mg of dried residue.</p> <p>5.2.3 <u>IF</u> more than ten (10) minutes are required to complete filtration of the sample <u>THEN</u> decrease the sample volume, but do not produce less than 2.5 mg of residue.</p>			
6.0 <u>SPECIAL EQUIPMENT, MATERIAL, AND PARTS</u>			
6.1 <u>Special Equipment</u>			
6.1.1 Analytical Balance - Capable of weighing to 0.1 mg.			
6.1.2 Drying Oven – Capable of maintaining temperature between 103-105°C.			
6.1.3 Thermometer - NIST traceable for monitoring oven temperature.			
6.1.4 Desiccator – Containing suitable desiccant,			
6.2 <u>Material</u>			
6.2.1 Glass-fiber Filter Membrane - 47 mm without organic binder. Whatman 934 AH, Gelman type A/E, Millipore type AP40, or equivalent.			
6.2.2 Filter Assembly - consisting of a filter holder base and a filter funnel.			
6.2.3 Filtration Flask.			
6.2.4 Vacuum Source.			
6.2.5 Forceps - Stainless steel or equivalent			
6.2.6 Planchet – Aluminum or stainless steel 65 mm diameter.			
6.2.7 Reagent grade water.			
6.2.8 TSS QC check standard – TSS QC standard of a known certified TSS value. May be purchased commercially from Ultra Scientific Company or other suitable vendor. Prepare the standard following manufacturer’s instructions. ^(C1)			
6.3 <u>Parts</u>			
6.3.1 None.			
7.0 <u>ACCEPTANCE CRITERIA</u>			
7.1 The TSS QC check standard recovery shall meet the requirements specified by the manufacturer. ^(C1)			

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8.0 <u>PREREQUISITES</u>			
8.1 Samples for TSS analysis which are intended to comply with NPDES permit requirements shall be analyzed within seven (7) days of the date and time of sampling.			
9.0 <u>PROCEDURE</u>			
9.1 <u>Preparation of Glass-Fiber Filter Membranes</u>			
9.1.1 Connect the filtration flask to a vacuum source.			
9.1.2 Position the filter holder base into the filtration flask.			
9.1.3 Center a glass-fiber filter membrane onto the filter holder base, wrinkled side of the filter membrane facing up.			
9.1.4 Place the filter funnel onto the filter holder base and secure with filter funnel clamp.			
9.1.5 Apply vacuum.			
9.1.6 Wash the filter membrane with three (3) successive, approximate twenty (20) mL portions of reagent grade water.			
9.1.7 Continue suction until all traces of water are removed.			
9.1.8 Discard the washings.			
9.1.9 Remove the filter funnel.			
9.1.10 Carefully remove the filter membrane from the filter holder base using forceps.			
9.1.11 Transfer the filter membrane to planchet.			
9.1.12 Repeat process for washing any additional filters.			
9.1.13 Dry the filter membrane(s) in an oven maintained at 103 to 105°C for at least 1 hour.			
9.1.14 Cool the filter membrane(s) in a desiccator.			
9.1.15 Weigh the filter membrane(s) to the nearest 0.1 mg using an analytical balance.			
9.1.16 Repeat the cycle of drying, cooling, desiccating and weighing the filter membrane(s) until <u>one</u> of the following criteria is met:			
<ul style="list-style-type: none"> • Constant weight is obtained, <u>OR</u> • The weight loss is less than 4% of the previous weight <u>OR</u> 0.5 mg, whichever is less. 			
9.1.17 Store the filter membrane(s) in a desiccator until time of analysis.			

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9.2 Sample Analysis

- 9.2.1 Connect the filtration flask to a vacuum source.
- 9.2.2 Position the filter holder base onto the filtration flask.
- 9.2.3 Tare the analytical balance.
- 9.2.4 Place a prepared filter membrane on the balance using forceps.
- 9.2.5 Record the weight of the filter membrane to the nearest 0.1 mg.
- 9.2.6 Center the weighed filter membrane onto the filter holder base, with the wrinkled side of the filter membrane facing up.
- 9.2.7 Place the filter funnel onto the filter holder base and secure with filter funnel clamp.
- 9.2.8 Apply vacuum.
- 9.2.9 Transfer a small volume of reagent grade water to the filter funnel to seat the filter membrane.
- 9.2.10 Transfer a measured volume of well-mixed sample (to yield between 2.5 and 200 mg of dried residue) to the filter funnel.
- 9.2.11 WHEN the sample passed through the filter membrane THEN wash the filter funnel and filter-disk with three (3) successive, approximate ten (10) mL volumes of reagent grade water, allowing complete drainage between washings.
- 9.2.12 Continue applying vacuum for approximately three (3) minutes after filtration is complete.
- 9.2.13 Remove the filter funnel.
- 9.2.14 Transfer the filter membrane to planchet using forceps.
- 9.2.15 Repeat for process for additional samples.
- 9.2.16 Dry the filter membrane(s) in an oven maintained between 103 to 105°C for at least 1 hour.
- 9.2.17 Cool the filter membrane(s) in a desiccator.
- 9.2.18 Weigh the filter membrane(s) to the nearest 0.1 mg using an analytical balance.
- 9.2.19 Repeat the cycle of drying, cooling, desiccating and weighing the filter membrane(s) until one of the following criteria is met:
 - Constant weight is obtained, OR

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- The weight loss is less than 4% of the previous weight OR 0.5 mg, whichever is less.

9.3 Calculation of Total Suspended Solids (TSS)

$$\text{mg total suspended solids / L} = \frac{(A - B) \times 1000}{\text{sample volume, mL}}$$

Where: A = weight of filter paper + dried residue, mg.

B = weight of filter paper, mg.

Example: A prepared filter disk had a tare weight of 0.4232 g, or 423.2 mg.

One liter of sample was filtered through the filter disk (in less than 10 minutes), and the final stable weight was 0.4267 g, or 426.7 mg. What is the Total Suspended Solids concentration?

Answer: A=425.7 mg, B=423.2 mg, Sample volume = 1 L = 1000 ml, so;

$$\frac{\text{mg total suspended solids}}{\text{L}} = \frac{(A - B) \times 1000}{\text{sample volume, mL}} =$$

$$\frac{(426.7 - 423.2) \times 1000}{1000} = \frac{3.5 \times 1000}{1000} = \frac{3.5 \text{ mg}}{\text{L}}$$