

		West Virginia Department of Health and Human Resources			
		MANUAL OF ENVIRONMENTAL HEALTH PROCEDURES			
Section	Waste Water	Date	July 20, 1998	Procedure #	WW-15
Subject	Design Criteria: Subsurface Stone Filter For Treatment of Mine Bath House Wastewater			Page	1 of 3

General

1. Subsurface stone filters may be used in remote areas for treatment of mine bath house wastewater where design average daily flows do not exceed 5,000 gallons.
2. A subsurface stone filter is a "trickling filter" and clean, coarse graded stone must be used. There must be free air circulation throughout the stone bed to maintain the proper biological growth on the stone.
3. After settling and filtering, the disinfected effluent is discharged to a sedimentation control pond. Under no circumstances can the water for the sedimentation control pond be recycled or reused for any purpose.
4. Sedimentation control ponds receiving subsurface stone filter effluent will require fecal coliform analysis in addition to the Division of Environmental Protection, Office of Water Resources' sampling requirements for sedimentation control ponds.
5. Settling tanks and chlorine contact tanks shall be accessible for pumping and possible manual cleaning. Pumpings shall be disposed of in accordance with Division of Health Legislative Rules, [64 CSR 47, Sewage Treatment and Collection System Design Standards](#).

Permit Application

1. Submit four (4) sets of application forms, [ES-69](#), and four (4) sets of plans, profiles, specifications and calculations to the Environmental Engineering Division, Office of Environmental Health Services.
2. Submit volume calculations and detailed plans and a profile for the sedimentation control pond.
3. Division of Environmental Protection, Office of Water Resources' waste load allocation and discharge permit is not required.

Design Criteria

1. Design average daily flow shall be based on 20 gallons per employee per 24 hours times the number of employees per 24 hours. Settling capacity shall be greater than or equal to design average daily volume and shall be provided in a dual compartment tank or dual tanks. The volume ratio of the first compartment or tank to the second compartment or tank shall approximate 2 to 1.
2. Area of the subsurface stone filter shall be sized based upon 12 gallons of settled effluent per day for each square foot of stone bed 5 feet deep.
3. Length to width ratio of the filter shall be less than or equal to 4 to 1.
4. Vents on the individual collection system lines shall be spaced 25 to 50 feet apart. On beds less than 25 feet long, one vent shall be placed on each collection line in the center of the bed. Solid pipe shall be used to construct vents.
5. Distribution and collection pipe configuration shall be in accordance with the attached plan and section detail.
6. Distribution box shall be used where the number of distribution lines exceeds four.
7. Disinfection shall be by tablet type chlorinators in accordance with Division of Health Legislative Rules, 64 CSR 47, Sewage Treatment and Collection System Design Standards.
8. Sedimentation control pond liquid volume shall be at least 75 times greater than the average daily design volume.

Materials & Construction

1. Settling tank specifications shall be in accordance with Division of Health Legislative Rules, 64 CSR 47, Sewage Treatment and Collection System Design Standards.
2. Piping specifications shall be in accordance with Division of Health Legislative Rules, 64 CSR 47, Sewage Treatment and Collection System Design Standards.
3. Aggregate utilized in the construction of the stone filter shall be coarse gravel, crushed stone or slag, 1½ to 4 inches in size with a hardness of 3 on the Moh scale of hardness. Crushed limestone shall be dolomitic. (Field test for hardness - aggregate shall scratch a copper penny without leaving a residue.)
4. Straw, hay, untreated building paper or newspaper shall be utilized to cover the stone filter prior to placing 4 to 8 inches of earth backfill and seeding.

5. Distribution lines shall be level and collection lines shall be laid on a 1% slope to the chlorine contact tank. Distribution line perforations shall face down. Collection line perforations shall face up.

Operation & Maintenance

1. Solids accumulation in each settling compartment should be checked monthly. When the volume of solids approaches 40% of the tank volume, the tank should be pumped.
2. The chlorine contact tank will require pumping if the chlorine residual continually decreases and solids have accumulated in the contact tank.

<u>References</u>	64 CSR 47, Sewage Treatment and Collection System Design Standards ES-69, Application for a Permit to Construct or Modify a Wastewater Collection and/or Treatment System
<u>History</u>	Replaces WW-15 dated June 7, 1989
<u>Attachments</u>	Plan and Section Detail