DEPARTMENT OF PUBLIC HEALTH DENTISTRY

FIELD VISIT REPORT

1. WATER PURIFICATION PLANT-CHIKSUGAR

Principal
Dr. GIRISH KATTI
PRINCIPAL
NAVODAYA DENTAL COLLEGE
RAICHUR.

Navodaya dental college

Department of public health dentistry

List of students enrolled in field visit

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2)	Adarsh A Menon	18D2486
3)	Aishwarya A Poojari	18D2487
4)	Amreen G	18D2488
5)	Ayesha Shimroze	18D2489
6)	Bindushree P	18D2490
7)	Bingi Chandana	18D2491
8)	Chethanpateel R	18D2492
9)	D Lavanya	18D2493
10)	Daya Devassy	18D2494
11)	Desini Jahnavi	18D2495
12)	Dolla Michael	18D2496
13)	Dongula Golapally Ajaykumar	18D2497
14)	Dudumalla Sahanadani	18D2498
15)	G Navya	18D2499
16)	G Rathish	18D2500
17)	Gangamma Abbigeri Hirematha	18D2501
18)	Guvvala Lavanya	18D2502
19)	Hiral Karwa	18D2503
20)	Indu	18D2504
21)	Jeneesha Saji	18D2505
22)	K Chandana	18D2506
23)	Kavya Bheemareddy Bhandari	18D2507
24)	Keerthi M H	18D2508
25)	Kiran Vidya Charan Kattimani	18D2509
26)	Kolharkar Andlib Sabah Aijaz	18D2510
27)	Kolluri Kalyani	18D2511
28)	Lakshmi K N	18D2512
29)	Madhushree S Patil	18D2513
30)	Manasa D R	18D2514
31)	Masa Trisha	18D2515
32)	Minnu Maria K Joy	18D2516
33)	Neelima B Prakash	18D2517

34)	Neethu Kennedy	18D2518
35)	Nimisha A	18D2519
36)	P Meghana	18D2520
37)	Parankusham Keerthana	18D2521
38)	P Sirisha	18D2522
39)	Police Kiran Kumar Reddy	18D2523
40)	Pooja Telgar	18D2524
41)	Priyanka	18D2525
42)	Priyanka Kumbar	18D2526
43)	R Shilpa	18D2527
44)	Raghavendra	18D2528
45)	Rapolu Indrani	18D2529
46)	Revathi P P	18D2530
47)	Rugved R	18D2531
48)	Rupambar Adhikari	18D2532
49)	Sandhya	18D2533
50)	Sanjana S	18D2534
51)	Shirisha V	18D2535
52)	Shreya	18D2536
53)	Shirisha D V	18D2537
54)	Sugali Ramavath Sai Meghana	18D2538
55)	Supriya T	18D2539
56)	Sushma N	18D2540
57)	Tanvika Mall	18D2541
58)	Thoppalada Uzma Batul	18D2542
59)	Varshini Gajendra Manganur	18D2543
60)	Vinayaka K N	18D2544
61)	Vishwanath Sumana Sri	18D2545
62)	Vishwas H S	18D2546
63)	Wupendram Harshitha	18D2547
64)	Y Sankar Rao Sai Santhoshi	18D2548
65)	Yadlapalli Yasaswini	18D2549
66)	Aishwarya Sagarad	18D2550
67)	Akepogu Shubakar Prasanna	18D2551
68)	Attahreem Shaista	18D2552
69)	Bomma Manideep	18D2553
70)	Chikkulapally Vaishnavi	18D2554
71)	Dona Joy Pullely	18D2555
72)	G Pooja	18D2556
73)	G Shravya Reddy	18D2557
74)	Jyothi	18D2558
75)	Karuna Manasa	18D2559
76)	Kushal	18D2560
77)	M D Sameer	18D2561
78)	N Surendhar Naik	18D2562
79)	Nair Shruti Suresh	18D2563

80)	Ramavath Charani	18D2564
81)	Shaik Arshad Hussain	18D2565
82)	Subhash Reddy Marthala	18D2566
83)	Trisha R Agiwal	18D2567
84)	Tummala Lavanya	18D2568
85)	Vemula Kavitha	18D2569
86)	Yerigeri Mohammed Hassan Sanzar	18D2570
87)	K Sindhura	17D8011
88)	Praful Kumar	16D8021
89)	R Bhardhwaj	14D3064
90)	Apeksha G Sanadi	17D8004
91)	Kavya	17D8010
92)	Rayan Saleen Qasmi	15D5057
93)	Binu Joseph M	14D8022
94)	Sneha David	17D8038
95)	Souparnika M Kulkarni	17d8022
96)	Pitta Neeraj	17D8034
97)	V Rithika Reddy	17D8026
98)	Shreeya Agarwal	17D8021
99)	Shivani PAWAR	17D8020
100)	Srinidhi H Mutalik	17D8023
101)	Sharankumar V Shadakshrimal	17D8019
102)	Miryala Likitha	17D8014
103)	Nagajyoti	17D8015
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105)	Harika Makam	17D8031
106)	Sabari Satheesh	17D8035
107)	Joharika Villuri	17D8040
108)	Sirigiri Sravani	17D8037
109)	T Jyothsna	17D8025
110)	Vijayalakshmi M	17D8027
111)	Revathi K	17D8018
112)	Sushma Halse	17D8024
113)	Lingam Dedeepya	17D8013
114)	Alvin Anto Thachil	17D8028
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119)	Annapurna M N	17D8003
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Principal

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PROJECT REPORT

"VISIT TO WATER PURIFICATION PLANT, CHIKSUGUR"- RAICHUR.

SUBMITTED BY:

BOGINENI HARSHITHA

Reg No: 17D8008

FINAL YEAR-BDS

BATCH 2020-2021

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NET'S

NAVODAYA DENTAL COLLEGE & HOSPITAL,

RAICHUR 584103

NAVODAYA

DEPARTMENT OF PUBLIC HEALTH DENTISTRY

CERTIFICATE

This is to certify that Mr/Miss. Bogirun? Harshitha of IV year B.D.S with Reg. number 1708008 has visited the water purification plant, Chiksugur as a part of his/her academic curriculum.

Signature of In Charge

Signature of HOD

Place: Raichur

Date:

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ACKNOWLEDGEMENT

I would like to acknowledge my heartfelt gratitude to the Principal of "Navodaya Dental College" Dr.Girish Katti for permitting us to visit the water Purification Plant at Chiksugur, "The Department of Public Health Dentistry" – Dr.Suresh Babu (Professor And Head Of The Department) , Dr. Zaheer Ahmed (Professor) , Dr.Kiran Kumar(Reader) and Dr .Somanath Reddy (Reader) for their encouragement and support and last but not the least "The Purification Plant Authority" for their cooperation.

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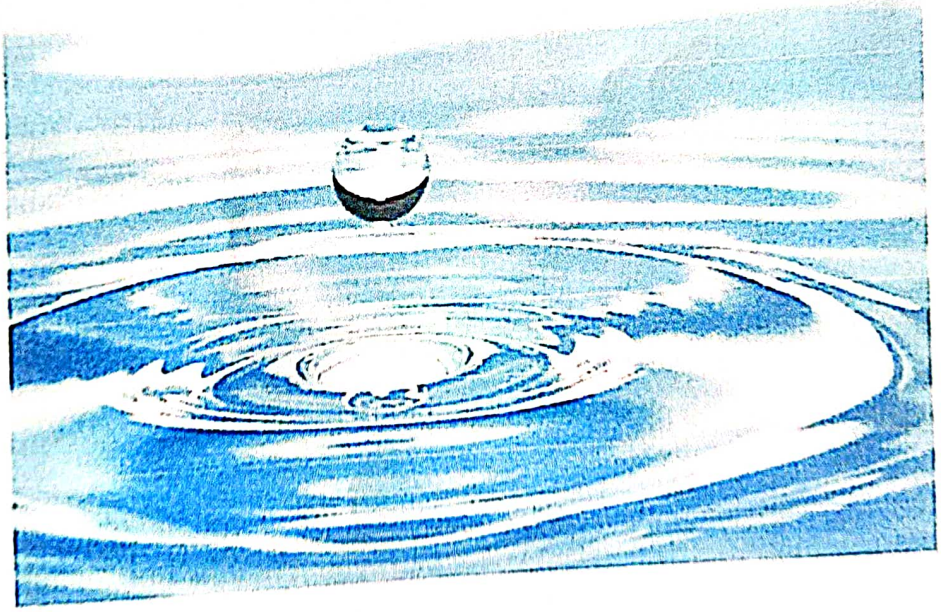
INTRODUCTION

Water is not only a resource, it is a life source. We all share the responsibility to ensure a healthy, secure and sustainable water supply for our communities, environment, and economy – our quality of life depends on it.

Water is a vital environmental factor to all forms of life including humans, animals and plants. Consumption of pure water helps in maintaining a good oral as well as general health, the presence of minerals like fluorides in water helps in preventing dental caries. Supply of pure water helps in the creation of a state of positive community health and well being.



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POTABLE WATER (SAFE AND WHOLESOME WATER)

- Potable water has been defined as water that is

A Free from pathogenic agents

B Free from harmful chemical substances

C Pleasant to taste, i.e. free from colour and odour

D Useful for all domestic needs

- Water plays an important role in domestic uses, public purposes, industrial uses, agriculture purposes, etc.
- A daily supply of 150 – 200 litres per capita is considered as an adequate supply to meet the needs for all urban domestic purposes

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VISIT TO WATER PURIFICATION PLANT

To increase our knowledge regarding safe water, our college thus organized a visit to Water Purification Plant at **CHIKSUGUR** on **28/08/2021.** The main aim of the visit was to know in detail the various steps taken for water purification on large scale.

We departed from our college at 09:30 am. by a bus and reached our destination at 10:30 am. Headed by **Dr. ZAHEER AHMED**

The Purification Plant Authority then explained us the whole water purification process with their utmost effort which is as follows;

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PURIFICATION OF WATER

1) LARGE SCALE

- Components:

(a)Storage

(b) Filtration

(c)Chlorination

2) SMALL SCALE

- Components:

(a) Household purification

- Boiling
- Chemical disinfection
- Filtration

(b) Disinfection of wells

- Double Pot method

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PURIFICATION OF WATER ON LARGE SCALE

The purpose of water treatment is to produce water that is safe and wholesome. The method of treatment employed depends upon the nature of raw water, and the desired standards of water quality.

I.STORAGE

Water is drawn out from the source and impounded in natural or artificial reservoirs. During storage, considerable amount of purification takes place. This is natural purification taking from three points of view:

1. Physical action: About 90% of the suspended impurities settle down in 24 hours by gravity. The water becomes clearer allowing penetration of light.
2. Chemical action: The aerobic bacteria oxidizes the organic matter present in the water With the help of dissolved oxygen reducing the content of free ammonia and increasing the concentration of nitrates.
3. Biological: During storage the pathogenic organisms gradually die out. However, if The water is stored for longer period there is likelihood of development of vegetable growth such as algae, which imparts bad smell and colour to the water.

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II.FILTRATION

Filtration is the second stage in the purification of water, and quite an important stage because 98 – 99% of the bacteria are removed by filtration

The two types of filters used are,

- The biological or "slow sand filter"
- The rapid sand or mechanical filters

We have rapid sand type of filtration at Chiksugur.

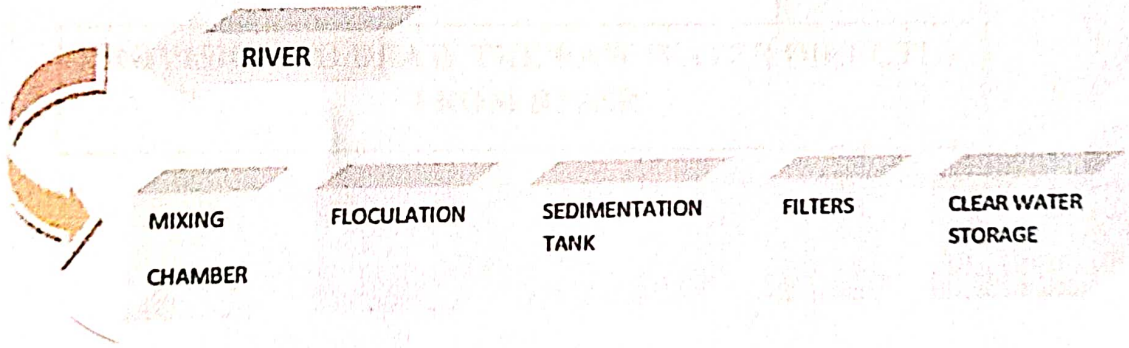
RAPID SAND OR MECHANICAL FILTERS

In 1885, the first rapid sand filters were installed in the U.S.A.

Rapid sand filters are of two types :

- The Gravity Type
- The Pressure Type.

Both the types are in use.



Flow diagram of a Rapid Sand Filtration Plant

- The raw water is first drawn from reservoir up to the highest surface level of purification plant.
- It is allowed to flow from a higher level to lower level through steps to decrease the pressure and velocity of water flow.

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PROVISION TO DRAW THE RAW WATER DIRECTLY FROM RIVER

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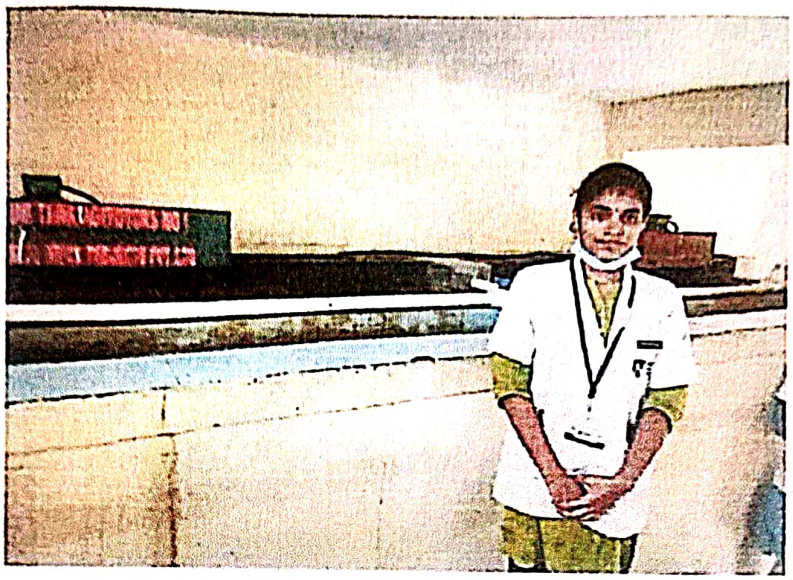
The steps involved are,

1) COAGULATION:

The raw water is first treated with a chemical coagulant such as alum. The dose varies from 5 – 40 mg/l depending upon the turbidity, colour, temperature and pH of the water.



ALUM CHAMBER

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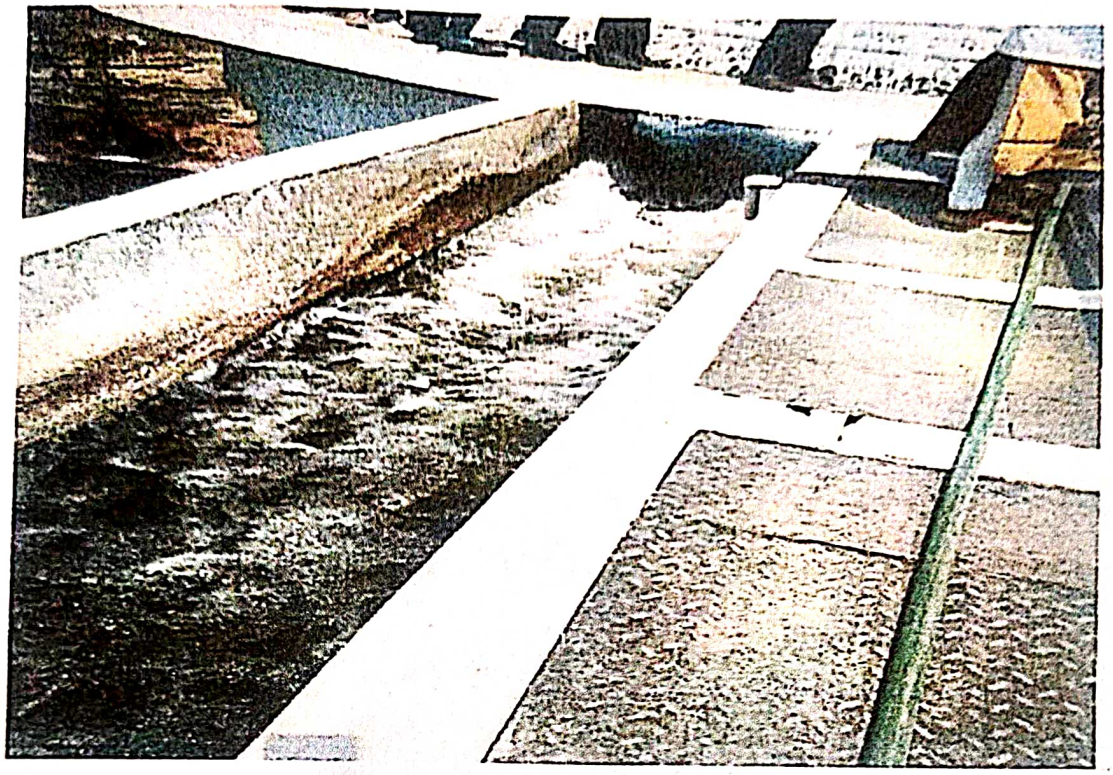
2) RAPID MIXING:

The treated water is then subjected to violent agitation in a "mixing chamber" for a few minutes. This allows a quick and through dissemination of alum throughout the bulk of water.



ALUM IS BEING MIXED RAPIDLY.

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3) FLOCCULATION:

This phase involves slow and gentle stirring of the treated water in a "flocculation chamber" for about 30 minutes. The mechanical type of flocculator is the most widely used. It consists of a number of paddles which rotate at 2 to 4 rpm. The paddles rotate with the help of motors. This results in formation of a thick, copious, white flocculent precipitate of aluminium hydroxide. The thicker the precipitate or flock diameter, the greater the settling velocity.

ARROW MARK INDICATES THE, CHAMBER WHERE WATER IS BEING FLOCCULATED.

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4)SEDIMENTATION:

The coagulated water is then led into sedimentation tanks where it is kept for 2-6 hours, when the flocculent precipitate together with impurities and bacteria settle down in the tank. The precipitate or sludge which settles at the bottom is removed from time to time without disturbing the operation of the tank.

THE PRECIPITATE OR SLUDGE WHICH SETTLES AT THE BOTTOM.

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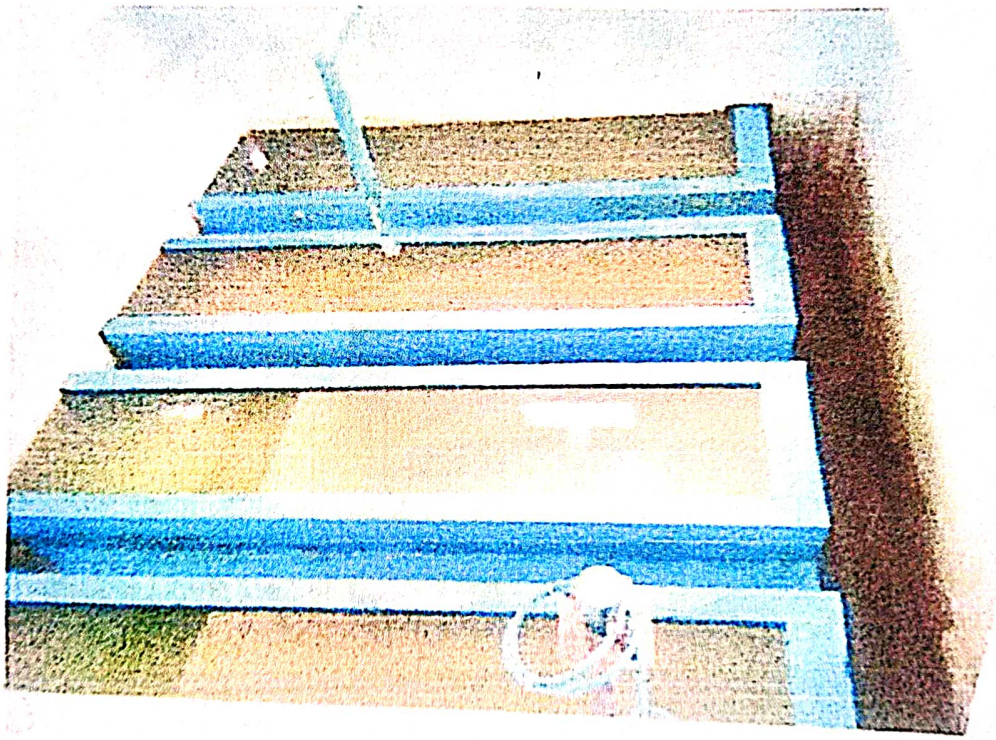
5)FILTRATION

The partly purified water is then subjected to rapid sand filtration.

FILTER BEDS

Each unit of filter bed has a surface of 80 - 90 m2. Sand is the filtering medium. The effective size of the sand particles is between 0.4 - 0.7 mm. The depth of the sand bed is usually about 1 metre. Below the sand bed is a layer of graded gravel, 30 to 40 cm deep. The gravel supports the sand bed and permits the filtered water to move freely towards the under drains. The depth of water on the top of the sand bed is 1.0 to 1.5 m. The rate of filtration is 5 – 15 m3/m2/hour.



FILTER BEDS TO BE USED FOR FILTRATION OF WATER.

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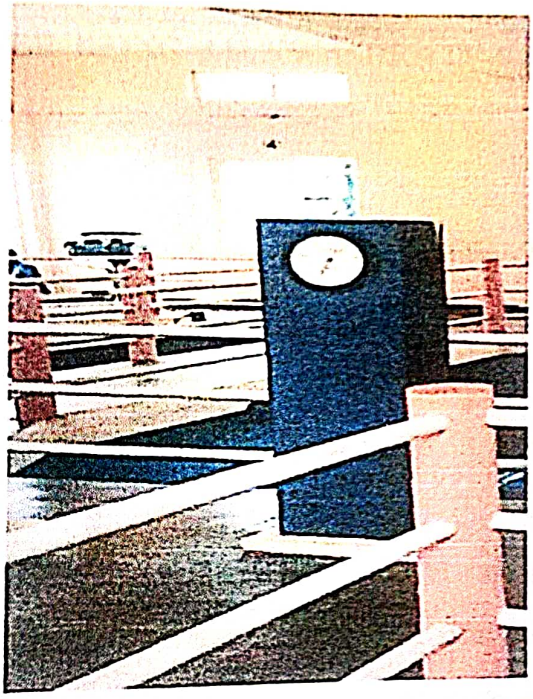
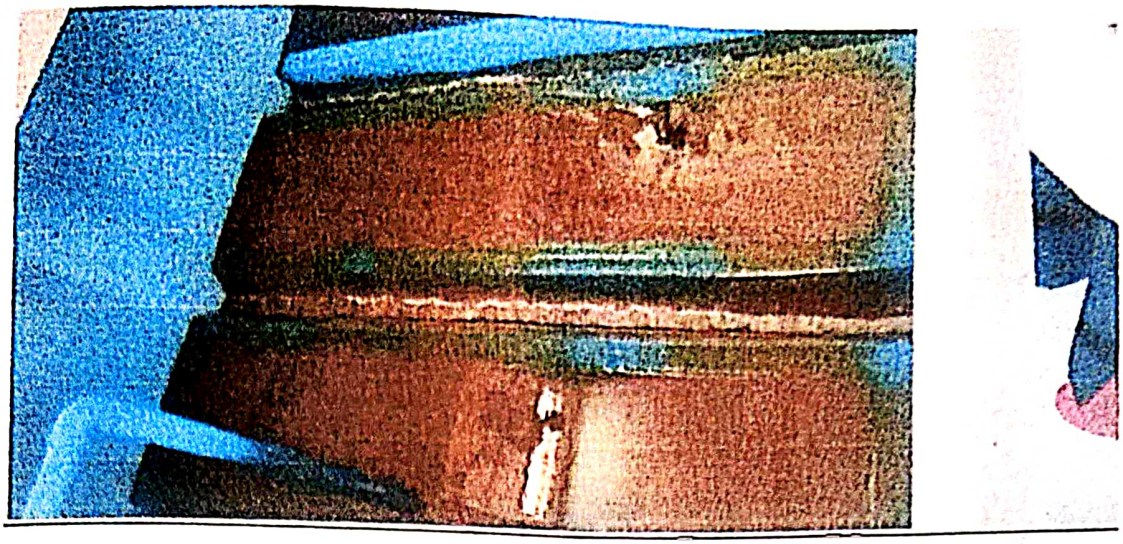
As Filtration proceeds, the " alumfloc" not removed by sedimentation is held back on the sand bed. It forms a slimy layer comparable to the biological layer in slow sand filters. It adsorbs bacteria from the water and effects purification. Oxidation of ammonia also takes place during the passage of filters through the filters. As filtration proceeds, the suspended impurities and bacteria clog the filters resulting in their reduced efficiency called "Loss of Head".

There are gauges that are attached to the filter beds that measures Rate of Flow and Loss of Head.



THERE ARE GAUGES THAT ARE ATTACHED TO THE FILTER BEDS THAT MEASURES THE LEVEL OF WATER IN FILTER.



THE WATER BEING BACKWASHED IN A RETROGRADE MANNER

When the loss of head approaches 7 – 8 feet, filtration is stopped and the filters are subjected to a washing process known as "back washing". Rapid sand filters need frequent washing daily or weekly, depending on the loss of head. Washing in accomplished by reversing the flow of water through the sand bed, which is called back washing. It helps in dislodging the impurities and cleaning up the sand bed. The washing is stopped when the washed water is sufficiently clean. The whole process of washing takes about 15 minutes. The purified water after filtration is sent for the next step of purification i.e. chlorination and the backwashed water is sent back to river by another provision

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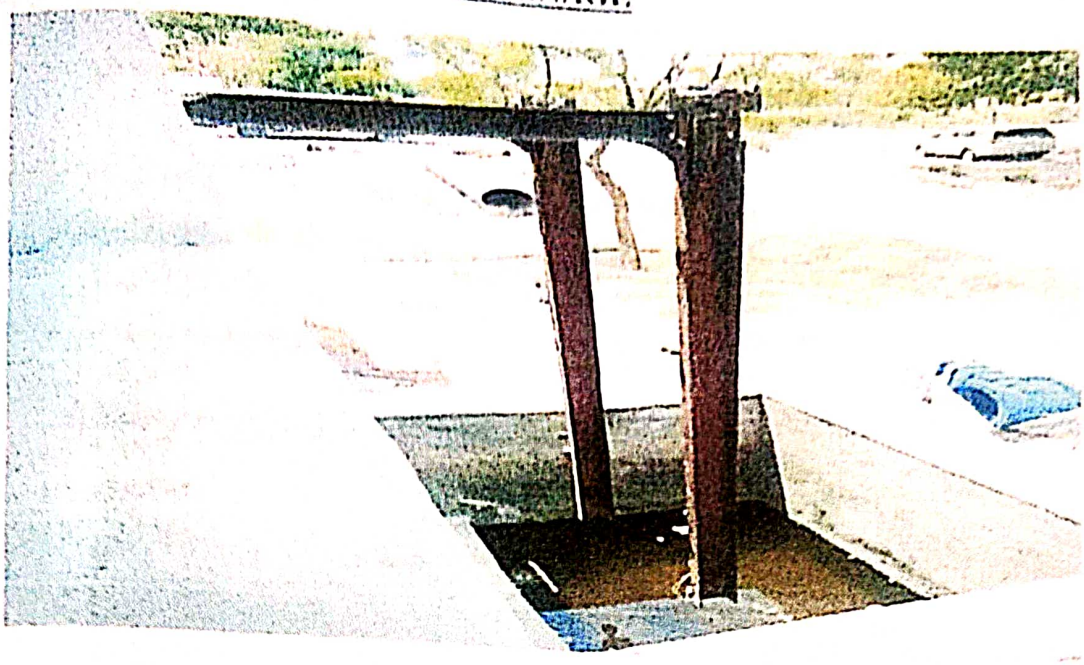
DRAINAGE



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CHLORINATION

Chlorination is a supplement and not a substitute to sand filtration. Its actions include,

- Chlorine kills pathogenic bacteria, but has no effect on spores and certain virusesexcept in high doses.
- It oxidizes iron, manganese and hydrogen sulphide.
- It destroys taste and odour producing constituents.
- It controls algae and slime organisms.
- It aids coagulation.

THE CHLORINE POWDER.

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ACTION OF CHLORINE

When chlorine is added to water, there is formation of hydrochloric acid and hypochlorous acid. The hydrochloric acid is neutralized by the alkalinity of the water. Thehypochlorous acid ionizes to form hydrogen ions and hypochlorite ions as follow:-

$H_2O + Cl_2 \longrightarrow HCl + HOCl$

$HOCl \longrightarrow H^+ + OCl^-$

The disinfecting action of chlorine is mainly due to hypochlorous acid. Chlorine acts best as a disinfectant when the pH of water is around 7 because of the predominance of hypochlorous acid. When the pH value exceeds 8.5 it is unreliable as a disinfectant because about 90% of thehypochlorous acid gets ionised to hypochlorite ions.

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PRINCIPLES OF CHLORINATION

- The water to be chlorinated should be clear and free from turbidity.
- The "chlorine demand" of the water should be estimated.
- The chlorine demand of the water is the difference between the amount of chlorine added to the water and the amount of residual chlorine remaining at the end of a specific period of contact at a given temperature and pH of the water.
- The point at which the chlorine demand of water is met is called the "break point". If further chlorine is added beyond the break point, free chlorine begins to appear in the water.
- The free residual chlorine should be present for acontact period of at least one hour to kill bacteria and viruses.
- The minimum recommended concentration of free chlorine is 0.5mg/litre for one hour.
- The free residual chlorine provides a margin of safety against subsequent microbial contamination which may occur during storage and distribution.
- The sum of the chlorine demand of the water plus the free residual chlorine of 0.5mg/l constitutes the correct dose of chlorine to be applied.

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METHODS USED

Chlorine is applied either as:

1. Chlorine Gas- 1st choice because it is economical, quick in action, efficient and easy to apply. But, it is an irritant to the eye and poisonous.
2. Chloramines: loose compound of chlorine and ammonia. They have a less tendency to produce chlorinous taste and gives a more persistent type of residual chlorine.
3. Perchloran: Also called high test hypochlorite and is a calcium compound.

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METHOD OF CHLORINATION

Break Point Chlorination:

The addition of chlorine to water to a point at which free residual chlorine begins to appear is called break point chlorination.

Superchlorination:

It comprises of the addition of large doses of chlorine to the water and removal of chlorine by dechlorination. This method is used for heavily polluted river water.

ADVANTAGES OF RAPID SAND FILTRATION:

It can deal with raw water directly. No preliminary storage is needed

The filter beds occupy less space

Filtration is rapid, 40 – 50 times that of a slow sand filter.

There is more flexibility in operation

The washing of the filter is easy.

UNDERGROUND STORAGE TANK USED TO STORE THE PURIFIED WATER

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ELECTRICAL PUMP IS BEING USED TOPUMP THE PURIFIED WATER TO THE CITY AS AND WHEN REQUIRED

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WATER FROM STORAGE TANK IS SEND FOR PUBLIC USE AS AN WHEN REQUIRED.

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Final year B.D.S ,2020-21 Batch who visited the water purification plant headed by

Dr. ZAHEER AHMED

FINAL YEAR 2020-2021BATCH

- And we reached back to the college by 2:15 pm with smile on our faces.

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CONCLUSION

The key to man's health lies in his environment. Much of man's ill-health can be traced back to the consequences of contaminated water. Thus it is important to purify water so as to create and maintain conditions that will promote health and prevent disease.

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