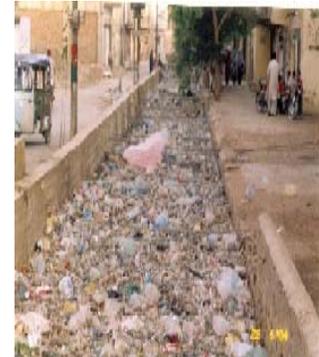


Investigation of Contamination of Drinking Water in Hyderabad City

By

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*Central Laboratory for Environmental Analysis
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Pakistan Environmental Protection Agency
Ministry of Environment
Islamabad

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Visit program

The visit to the Hyderabad City was made according to the following program;

Date/Day	Schedule
20 th June 2004 (Sunday)	Arrival in Hyderabad
21 st June 2004 (Monday)	Visit of Supply source, Treatment Plant and Hospital
22 nd June 2004 (Tuesday)	Visit to the effected areas, Collection of Samples and Public Views
23 rd June 2004 (Wednesday)	Departure for Islamabad

Report on Contamination of Drinking Water in Hyderabad

1. Background

Hyderabad, the second largest city of Sindh province is situated on the left bank of river Indus. It has population of about 1.8 million. To respond to the rapid increase of urban population in recent years, the city of Hyderabad has attempted to improve the means and facilities to maintain the environmental conditions in the urban areas. Here in the city the capacity of treating drinking water, refuse collection and disposal of solid waste falls far below the demand. A huge quantity of raw water is supplied without treatment and large volume of refuse is left and burned in the backyard of buildings, streets and side ditches whereby creating unhygienic conditions and affecting public health.

1.1 Manchhar Lake

Manchhar Lake is situated on the right bank of river Indus in district Dadu. It is about 150 km from Hyderabad city. In past lake's main source of water supply was river Indus. But due to shortage of water, fresh water supply to the Manchhar Lake from the Indus River has been cut off from last 12 year.

Now Manchhar Lake has two main water sources,

- a. Rain water drains.
- b. Right Bank Outfall Drain (RBOD)

RBOD brings the saline surface water of Shikarpur, ShehdadKot, Larkana and Jaicobabad District. Also a drain from Balochistan namely Hairdin also fall in RBOD. Manchhar Lake water can only be drained out into river Indus. Because it is highly saline water so when this practice is carried out at the same time large quantity of water from Sukkur barrage is also released. In this way saline water becomes diluted. But at this time when water was released from Manchhar Lake, no water from Sukkur barrage was released for dilution and also kotri barrage had less amount of water. So it was not properly diluted. Due to poor facility of laboratory at treatment plant, WASA authorities could not detect the contamination of water and supplied this highly saline water to the city without adding any proper treatment.

2. Purpose of Investigation

- i. To observe the present status of the drinking water supply system in Hyderabad
- ii. To assess the contamination in drinking water.

3. Team Composition

For the collection of information, samples and to observe the treatment facility and water supply system a team comprises of following members visited the Hyderabad City;

- i. Mr. Zaigham Abbas, Assistant Inspector, Pak-EPA, Islamabad
- ii. Mr. Imran Ali Malik, Assistant Inspector, Pak-EPA, Islamabad
- iii. Mr. Kishan Chand Mukwana, Assistant Director, EPA, Sindh

4. Drinking water Supply and Demand

The main source of supply of drinking water to the city is river Indus. The brief details of the supply of drinking water and actual demand is given as under.

i.	Population of Hyderabad City	1.8 million
ii.	Source of Drinking water supply	River Indus and Phuleli Canal
iii.	Recommended demand of water per capita/day	30 gallons
iv.	Demand of Drinking water of the City	54 MGD
v.	Demand for commercial uses	5.4 MGD (10%)
	Total Demand of water of City	60 MGD

Treatment Capacity

i.	Old Treatment plant	10MGD
ii.	New Treatment Plant	30MGD
	Total Supply of Treated Water	40 MGD

Raw / Settled Water (Seepage water)

a.	Paretabad System	1MGD
b.	Hala Naka	2MGD
c.	Partly Latifabad	2MGD
	Total Untreated water (Raw water) supplied	5MGD

for the drinking purposes

Summary

Total Demand of the City	60MGD
Treated Water supplying capacity	40MGD
Untreated water (Raw water) supplying capacity	05MGD
Net Shortfall against total demand	15MGD

5. Visit program

Visit program may be seen on Annexure "A".

6 Visit to Supply Source and Treatment Plant

A team comprises of above members visited the New Treatment Plant (30MGD) on 21st June 2004. Here team was briefed by Mr. Abdul Qayyum Junaijo (Xen) Treatment Plant. A discussion was made regarding the plant capacity, facilities and the incident of water contamination. During the discussion it was pointed that the water contamination was firstly detected by Thermal Power Station on 13th May 2004.

6.1 New Treatment Plant (30MGD)

It was observed that WASA treatment plant has poor lab facilities, according to the requirement of the drinking water analysis and also they have not any proper chemist for the analysis. Further that there was no protective fence for the lagoons. As all the chlorinators were out of order so direct addition of bleaching powder was being carried out now after the incident. Reports of analysis were also seen which was carried out after 13th May 2004 continuously. The reports showed high values of TDS (Total Dissolved Solids), Alkalinity and Hardness.

6.2 Old Treatment Plant (10MGD)

Old treatment plant has a capacity of 10MGD. Plant condition was very poor. All the electric blender motors were found out of order. In this situation plant efficiency for removing the turbidity of water was much below than the required level.

7. Visit to Jamshoro University

On 22nd June 2004, team also visited the Chemistry Department of Jamshoro University. Dr. M. Y. Khuhawar, Director, Chemistry Department, told that in last 25 years, he had never observed the TDS of Indus water more than 500 mg/l. But this time TDS were ranged from 1500 to 1700 mg/l in the upstream. According to him, Manchhar Lake may be the major cause of the water contamination. He told that in 2002 a study was conducted on Manchhar lake water Quality. At that time TDS of Manchhar were 3500 to 4000 mg/l. It was also pointed out that the safe limit for the dilution of Manchhar lake water into Indus River should be 1:20. But this time the dilution ratio was only 1:1.5, which caused high contamination to the Indus River.

8. Visit to the Hospital

Two Hospitals in Hyderabad city were visited to observe the present situation of patients in the hospitals and to get information about the diagnosis of the patients registered during the water contamination.

8.1 Visit to CDF, Hospital,

Dr. Mush bah and Dr. Shamim were visited in the CDF, Hospital. According to their statement, normally 3 to 4 patient with gastrointestinal tract (GIT) infections visited daily, but after 13th May 2004, the number increased from 8 to 9 daily. Mostly problem was found in children. May be it was due to the bacteriological contamination. Total 300 patients registered but no death case was found in CDF Hospital

8.2 Visit to Memon Charitable Hospital

Dr. Mukash of Memon charitable hospital was visited. He told that actually it was the season of Gastro Intestinal Tract (GIT) infection. In normal routine 24 to 30 patients visit daily in OPD. During these days number of patient increased up to 50. He also told that cause of Gastro is not only contaminated water. Contaminated food and hot weather

is also other causes of Gastro. Muhammad Younis Administration Supervisor told that no death occur due to Gastro in this Hospital. Dr. Sajjad & Dr. Asghar of Memon Charitable hospital, Children Ward, told that no death occurred due to Gastro in this hospital. Actually From June to August Gastro is common in Hyderabad. At present, they also have 5 to 6 patients of Gastro in the Hospital. Medical Laboratory Technician of Memom charitable hospital told that E-Coli were detected in the stool of the Patients.

9. Sampling of Drinking Water

Total six samples of drinking water were collected from the treatment plant, supply sources and from the end users. The details of samples are as under;

%Sr. No.	Sample Description
1.	Inlet to the 30MGD water treatment plant
2.	Out let from the 30&10MGD water treatment plant
3.	A Residence Prince town Qasimabad
4.	A Residence Latifabad Unit-9
5.	One tree bund Supply Latifabad Unit-4
6.	A Residence Bomin Wah Road, Nishat Chowk near Memon Charitable Hospital

10. Results, Discussion and Conclusions

The above collected samples were analyzed for E-Coli/Coliform.

Methodology

The samples were directly taken into the Merk certified E-coli/Coliform detection vials and an ampule of media was also added in it. The vials were incubated at room temperature for 24hrs. and the presence of E-coli/Coliform was observed by colour indication.

The results are as under;

Sr.	Sample Description	E-Coli /	Remarks
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No.		Coliform	
1.	Inlet to the 30MGD water treatment plant	Positive	High risk
2.	Out let from the 30&10MGD water treatment plant	Negative	Bacteriologically fit due to * mixing of bleaching powder.
3.	A residence of Prince town Qasimabad	Negative	Bacteriologically fit
4.	A residence of Latifabad Unit-9	Negative	Bacteriologically fit
5.	One tree bund Supply Latifabad Unit-4	Negative	Bacteriologically fit
6.	A residence Bomin Wah Road, Nishat Chowk near Memon Charitable Hospital	Positive	High risk

* Chlorinators were out of order. So bleaching powder was started mixing after the incident.

Discussion and Conclusions

According to the bacteriological analysis sample-1 (inlet of 30 MGD water treatment plant) and sample-6 (A residence of Bomin Wah road, Nishat Chowk near Memon Charitable Hospital) are found to be unsatisfactory and are associated with high risk for human consumption.

Water from out let of 30 & 10 MGD filtration plant is bacteriologically fit due mixing of bleaching powder.

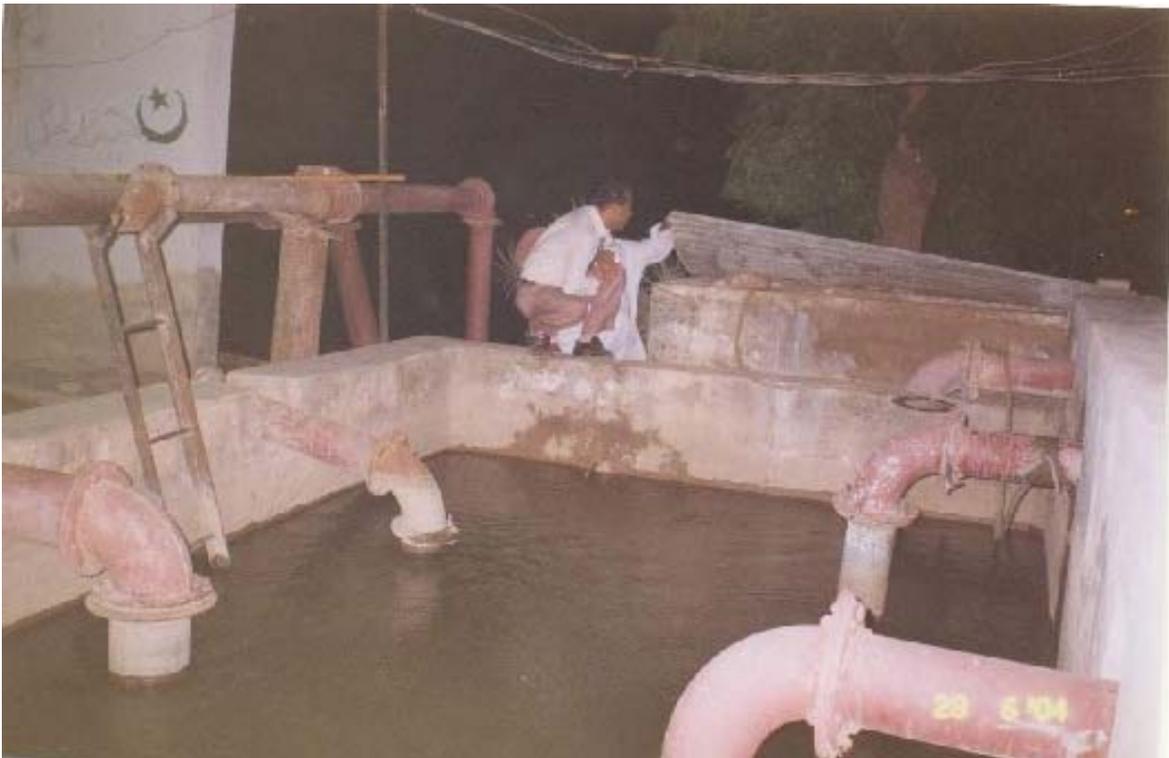
11. Recommendations

- i. WASA treatment plant (30MGD&10MGD)) should be maintained properly and measures must be taken to increase the efficiency of the existing plants. And also a new treatment plant must be installed to fulfill the demand of drinking water.
- ii. There should be a proper lab setup with manpower for the analysis of water quality regularly.
- iii. Drinking water supply lines should be repaired and maintained properly.
- iv. Solid waster should be properly disposed off at some specified dumping sites.
- v. There should be coordination between WASA and Irrigation department.
- vi. Water quality of Manchhar Lake and river Indus should be monitored regularly.

Photos



Poor water condition at WASA filtration plant



Raw water is being supplied by WASA to the city



Sample is being taken from outlet of old filtration plant



Clean water supplied by WASA showing high turbidity.



Dumping of solid waste in sewage channel



Sewage water on the road indicating poor condition of sewage system.