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Theme: "Water Conservation & Management"

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Abstract

Water is life and it is very much essential.

Water conservation is a process that is beneficial to any industry as well as the environment because it saves water and money. Zero liquid discharge systems employ the most advanced wastewater treatment technologies to purify and recycle virtually all of the wastewater produced. Also Zero liquid discharge technologies help plants meet discharge and water reuse requirements, enabling businesses to meet stringent cooling tower blow down and flue gas desulfurization (FGD) discharge regulations.

The implementation of ZLD system will take time so as an improvement or with the vision of saving water should look for small initiatives for water conservation. Our study is a small step for achieving that goal for NTPC Kawas.

Bio-Data of Authors:-

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- Joined NTPC as Executive Trainee in 2008
- Seven years of O&M experience at NTPC KAWAS.

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Introduction

Water conservation planning contributes to a sustainable and healthy resource by recognizing water as a valuable, finite resource to be utilized efficiently, wisely and cost-effectively to sustain a high quality of social, environmental, and economic well being, for the present and the future. Efficient water use can have major environmental, public health and economic benefits by helping to improve water quality, maintain aquatic ecosystems, and protect drinking water sources.

Water quality and quantity affect aquatic ecosystems and their biological integrity. Water conservation systems can help owners and operators avoid, downsize, or postpone water and wastewater projects.

Water quantity is protected by reducing water withdrawals. This helps improve water quality, maintain ecosystems, and protect water resources overall. For example, runoff from the excessive watering of golf courses, and lawns can introduce harmful contaminants such as salts, sediments, pesticides, herbicides, nutrients, chemicals, metals, oil, viruses, bacteria, and other pollutants into our streams, rivers, and lakes, and degrade water quality.

Water Flow Diagram of NTPC Kawas

- Water Drawn from Singapore Weir (Upstream of River Tapi) at Variav through 16 KM pipeline having pumping capacity of 1500 Cu. M/Hr.
- Raw Water fed through Intake channel up to Two Reservoirs of Capacity approx. 14.4 Lac Cu.M, with Water distribution in the ratio of 1:4. (refer figure.1)

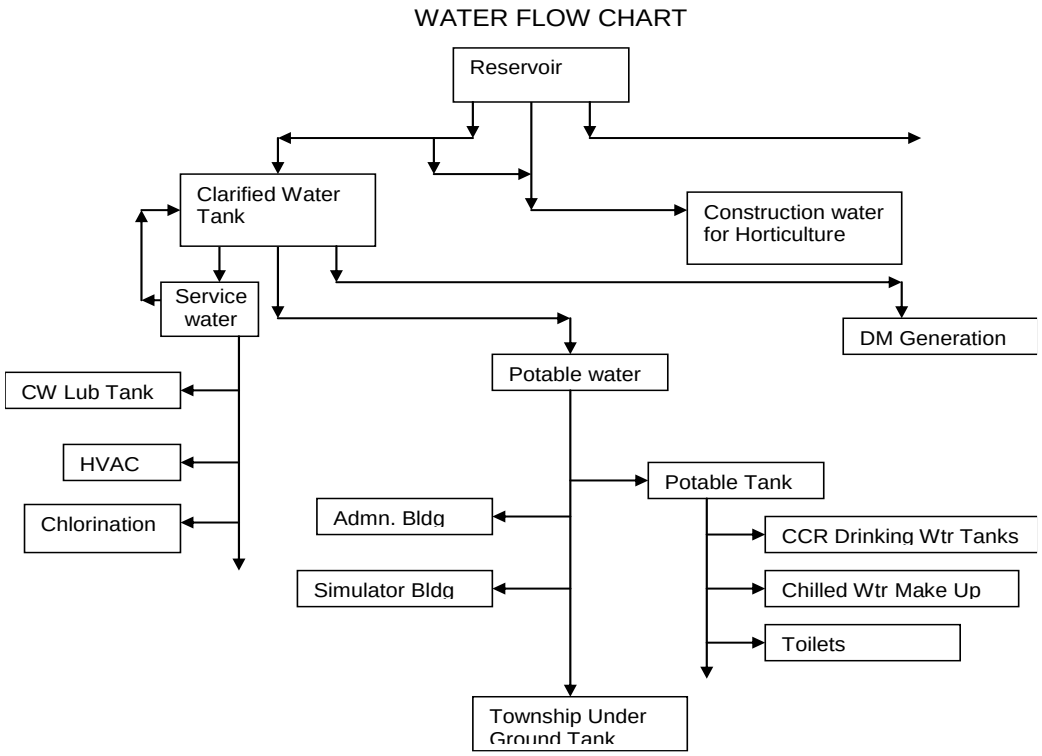


figure-1

Water Treatment Plant Layout at NTPC Kawas

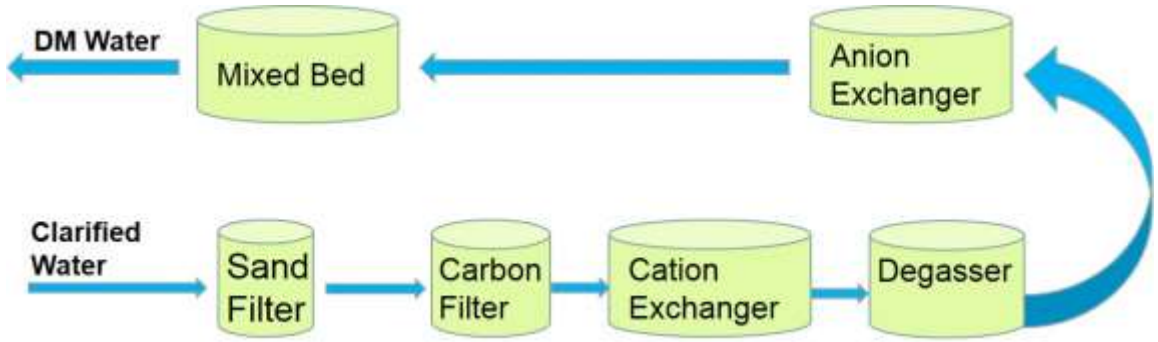


figure-2

Understanding the Boiler Schematic

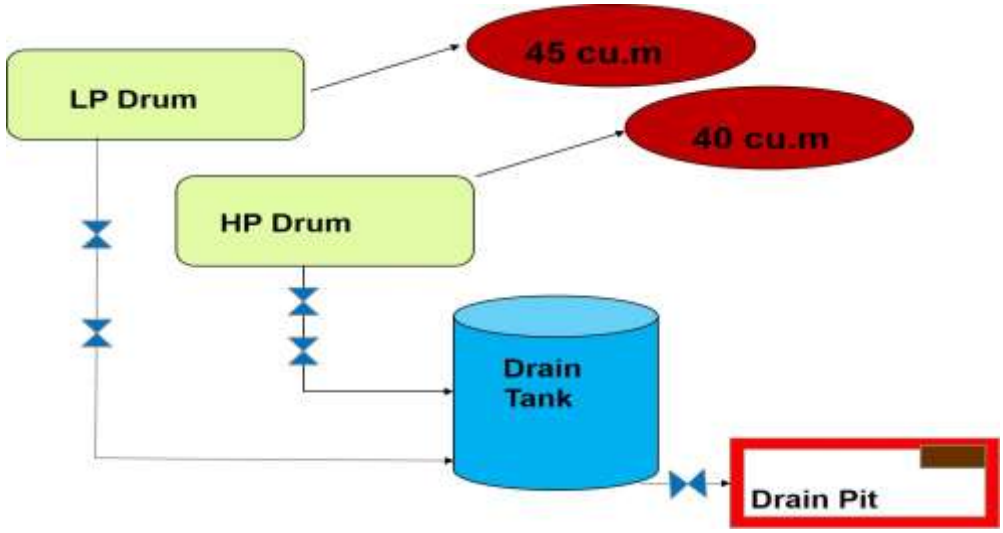


figure-3

Untapped DM Water Analysis

Due to less schedule at Kawas there are frequent unit start-up shut down at Kawas. Owing to which two units boiler are normally under preservation. Also frequent start-stop has resulted into westage of DM water. The details water which could be arrested from getting wasted is mentioned in the below mentioned table-1

Sr. No	Description	Volume	No of events per year	Total
1	Cold Start-up	150-200 m3	10	500
2	Warm Start-up	30-60 m3	30	200
3	Boiler Preservation	100	2*10	2000
4	HP/LP hydro	120	3*4	1440
5	Frequent Start-up Boiler Drained Water	10-15	40-60	400
Total				4540 m3

Table-1

Detailed Chemical Analysis of Water Samples

After the quantity of water getting wasted was evaluated there was a need for assessment of the quality of water. With the help of chemistry department lab operators the sample analysis done and the comparison of the same was done with the standard range of water parameters and all the parameters found satisfactory.

Solution:

Understanding and comparing the parameters there were 5 possible ways in which the water can be saved as per figure-4. The detailed financial analysis for the expenditure incurred for the modification/layout is also calculated and the break even comes out to be around 1 year.

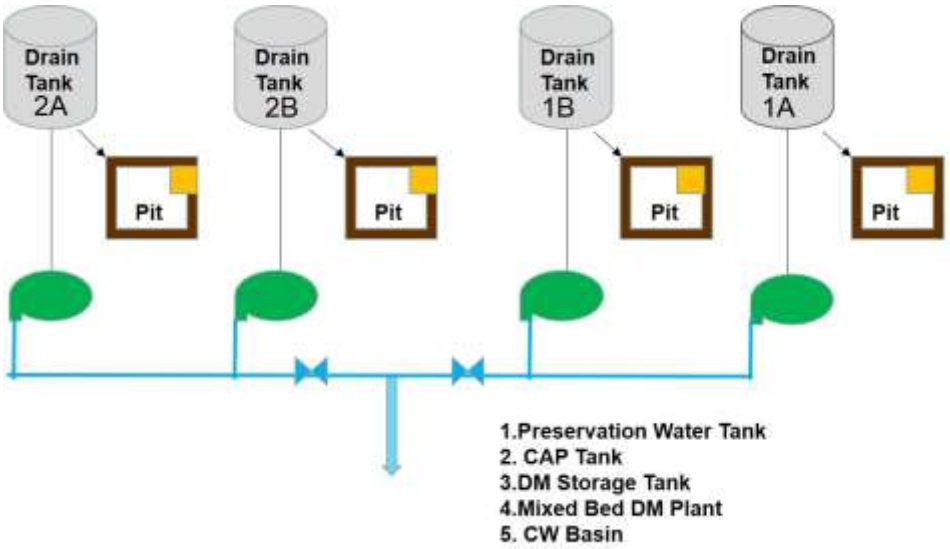
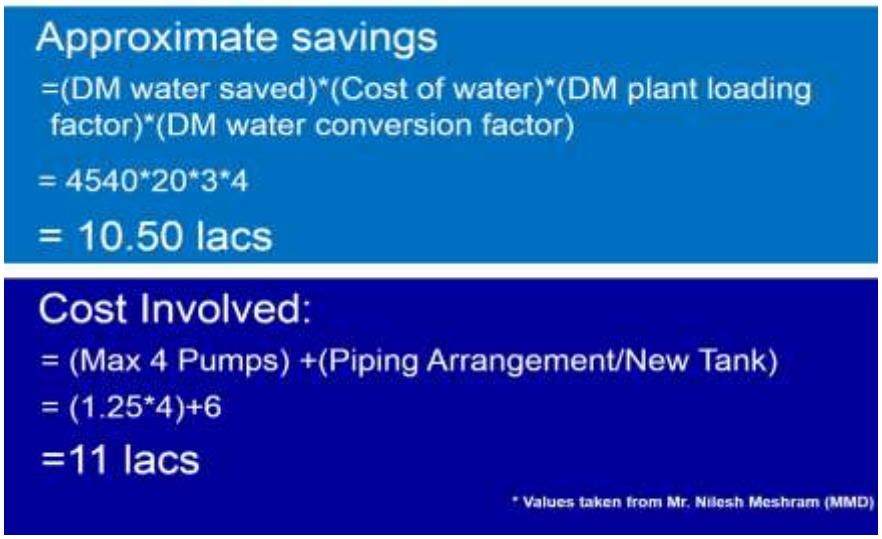


figure-4

Cost Benefit Analysis :



Recommendations:

The initiative and the improvement suggested in the present system of water cycle of power plant is the short term and immediate solution to the water conservation. This will lead to saving huge amount of water and the capital cost involved for its implementation is also not high.

The long term solution to water conservation is to go for zero liquid discharge and usage of sewage treated water in power plants which has already been taken up by The Ministry of Power to be implemented across all power plants in India as per feasibility.