Installation of Side Stream Filtration for Cooling Tower

(***For Medak Bulk-drug Cluster***)

Introduction:

The pharmaceutical industry is one of the fastest growing segments of the Indian economy and has experienced rapid and sustained expansion since the second half of the 20th Century. Indian pharmaceutical manufacturing companies are present at each stage of the production process: APIs; pharmaceutical formulation intermediates (PFIs); and finished dose products (FDPs, the end product). PFIs are the intermediate product between an API and a finished dose. An API is the base ingredient of medicine that is biologically active, and the term bulk active (or bulk drugs/ingredients) is also used. Some Indian companies specialise in one or two of these three stages.

Today, India is one of the world's leading suppliers of generic drugs, which account for approximately 75 per cent of its market by volume16 and revenues of $15 billion in 2014.The country is responsible for around one-fifth of the world's production of generics, which is considerably higher than its share the overall pharmaceuticals market (which stands at approximately 2%).India's Bulk Drugs Manufacturers Association describes the sector's recent growth as "phenomenal" and "one of the highest among the developing countries."Anti infectives, which include antibiotics, antivirals and antifungals, are the largest segment on the domestic market, accounting for around one quarter of total turnover.

The Indian pharmaceutical industry is highly fragmented, with more than 20,000 registered manufacturing units nationwide. It is also geographically dispersed: production takes place in multiple locations across the country, with the states of Maharashtra, Gujarat, Telangana, Andhra Pradesh, West Bengal and Tamil Nadu all registering a sizeable manufacturing and processing presence. The city of Hyderabad in Telangana state, which was part of Andhra Pradesh until its division into two separate states in 2014, emerged early on as a pole of bulk drug manufacturing. In 1961, Indian Drugs and Pharmaceuticals Limited (IDPL), a government-owned company, was set up under the premiership of Jawaharlal Nehru with a mandate to "free India from dependence on imports and to provide medicines to the millions at affordable prices." Its establishment in Hyderabad (it also has offices in New Delhi and Rishikesh, Uttarakhand state) heralded the emergence and subsequent concentration of the generic drug industry in the city. A number of IDPL employees subsequently established their

own companies, which now rank among India's leading pharmaceutical firms, including the founder of Dr Reddy's, one of India's largest drug companies.

According to the Indian Bulk Drug Manufacturer's Association(BDMA) there are 47 units in Medak District. And the electricity is drawn from Telangana State Southern Power Distribution Company Limited (TSSPDCL) and source of coal is from Singareni Collieries Company Limited (SCCL).

Existing Practice:

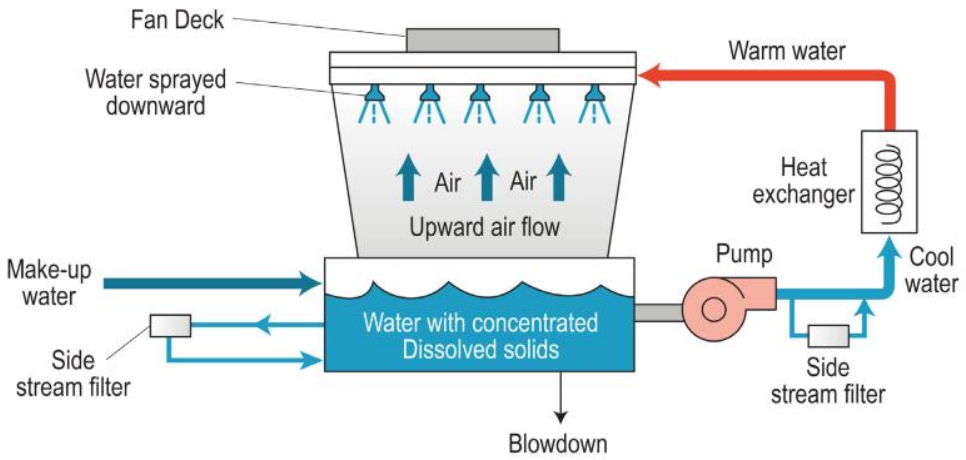
Cooling towers are an integral component of many refrigeration systems, providing comfort or process cooling across a broad range of applications. Cooling towers represent the point in a cooling system where heat is dissipated to the atmosphere through evaporation. Cooling towers are commonly used in industrial applications to release waste heat extracted from a process through evaporation of water.

Cooling tower systems operation is most efficient when the heat transfer surfaces are clean. However, these are dynamic systems due in part to their operating environment and because of the nature of their application. Cooling towers operate outside and therefore are open to the elements, making them susceptible to dirt and debris carried by the wind. Further, they often experience wide load variations and their operation can be significantly influenced by the quality of the water used for makeup in the system.

Proposed Technology:

It is proposed to install the side stream filtration for cooling towers. Side stream filtration systems continuously filter a portion of cooling water to remove debris and particles. Filtered Water is then pumped back into the main condenser line through a nozzle or returned to the cooling tower basin (called the sump). **These systems remove suspended solids, organics, and silt particles for a portion of the water system on a continuous basis, reducing the likelihood of fouling and biological growth, which helps to control other issues in the system such as scaling and corrosion, the system will remove the Total Suspended Solids (TSS)**. This improves system efficiency and often reduces the amount of Water rejected from the system. Side stream filtration reduces the likelihood of scale and fouling on the heat exchangers. Even the smallest layer of scale or fouling on heat exchange Surfaces can reduce the rate of heat exchange, forcing the system to work harder to achieve the required cooling there by reduction in energy consumption.

Besides reduction in Energy Consumption, it also reduces water consumption, reduces chemical use and it also lowers the maintenance cost.



Energy & Monitoring saving:

S. No	Parameter	Unit	Value
1	Energy Saving Potential **(results from Installed locations minimum)**	%	10.5
2	Chiller Capacity installed capacity	TR	500
3	Chiller Operating Capacity	TR	500
4	Specific Consumption Clean Heat Exchanger	kW/TR	0.7
5	Specific Consumption Fouled Heat Exchanger	kW/TR	0.7735
6	Average Load	%	70
7	Power loss by chiller @average load	kW	25.725
8	Savings potential on conservation basis(Considering 80% Savings)	kW	20.58
9	No. of Operating hrs in a day	Hrs	24
10	No. of operating days/year	Days	300
11	Electricity tariff	Rs/kWh	7
12	Annual Saving on Energy Consumption	Lakhs	10.37
13	Investment	Lakhs	8
14	Simple Pay Back Period	Months	10

Benefits:

1. Less maintenance of the separator, due to its centrifugal non Barrier filtration method with no moving parts inside the separator.
2. Entire piping and machines will be free of dirt, hence save energy, water & money and helps in operating at designed efficiencies.

3. Reduces fouling.
4. Reduces Cleaning of systems by three times.
5. Minimize maintenance, downtimes and labour costs.
6. Maintains thermal performance of Cooling Tower and Condenser.
7. Maximize equipment life.
8. Optimize the effectiveness of water treatment programs
9. Helps saving Water losses and thereby helps in increasing COC.

Replication Potential:

Based on the discussion with association and also units it is estimated that the technology has a replication potential of 15 to 20 installation in the medak cluster. Based on the given replication potential the overall project is given as follows:

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S.No	**Parameter**	**Value**	**Units**
1	Total No of SME Units in the cluster	47	No's
2	Replication Potential of the units in cluster	15	No's
3	Envisaged Annual Energy Savings per Unit	1.48	Lakh kWh
4	Investment Required per Unit	8	Lakhs
5	Envisaged Annual Energy Savings per Cluster (15 No's of Units)	22.2	Lakh kWh
6	Investment Required for Cluster (15 Units)	120	Lakhs
7	Cost of Electricity	7	Rs/kWh
8	Envisaged Annual Monetary Savings for Cluster	155.4	Lakhs
9	Payback Period	9.2	Months
10	Savings in MTOE	191.1	MTOE
11	Reduction in CO2 in Cluster	1823	TCO_2

Availability of the technology

The technology is available in India and many manufacturer's have their service centres in the state of Telangana. NPC has contacted SEVCON INDIA SOLUTIONS and NPC is the process of finding out other suppliers of this technology in India.

Effect on the Process:

This technology will reduces fouling thereby increasing the system efficiency and also reduces the cleaning of condenser tubes by 3 times. The proposed system makes the entire piping and machines will be free of dirt, hence save energy, water & money.

Reasons for Unpopularity:

This technology has yet not penetrated in to the SME cluster because of the following reason:

- ✓ Lack of knowledge and not updated with the recent developments.
- ✓ Financial constrain being an MSME.
- ✓ No one has yet demonstrated the results of the technology in MSME unit

Payback Period:

The simple payback period for the technology comes out to be less than a year.

Why the technology has not been implemented so far in the cluster?

SME unit's were not aware of this technology.

Is there any operational risks involved?

No operational risks involved and won't effect the regular operation.

Boundary Conditions/Limitations

This technology needs to be implemented near the cooling tower. As such there is no limitations.

Vendor Information:

1. Sourav Dhara
   Manager
   Mob: +91 9650572851
   Email: sourav.dhara@sevcon.in
   Sevcon India Pvt. Ltd.
   1012, Chiranjiv Tower | Nehru Place 43 | New Delhi – 110019

2. Mr. A.M.Shinde
   Fluid Systems
   58/59, D II Block, MIDC Chinchwad,
   Pune, Maharashtra, India 411019.

3. Rajkumar Hosamani
   Sales Head (Western & South)
   Cell : +91 8898875252
   Email : rajkumar@sureflo.in
   Sureflo Techcon Pvt Ltd
   A-101, New India Chambers,
   Cross Road 'A', Off MIDC,
   Behind Onida House,
   Andheri (East), Mumbai – 400 093.
   Tel.: +91 22 41200915 / 16 / 17