



**CASE STUDIES OF INSTALLATION OF  
MIST COOLING SYSTEM**



**ANNEXURE – A**

**MIST COOLING SYSTEM AT  
M/S. HALDIA PETROCHEMICALS LTD., HALDIA  
(OPEN TYPE MIST COOLING SYSTEM)**



## ANNEXURE-A

### SPECIFIC CASE STUDY OF INSTALLATION OF MCS AT M/S. HALDIA PETROCHEMICALS LTD. HALDIA

**HPL is a petrochemical complex located at Haldia in West Bengal. They have a Refinery, Petrochemical Plant and a CPP at the complex operating since year 2000.**

**In the petrochemical plant, HPL was facing problems with existing cooling tower. During peak summer when WBT goes up to 31°C (Mid May to Mid September), it was observed by HPL that cooling water temperature was going beyond 35°C against required 32°C. Following units were in trouble due to this**

- 1) Pyrolysis Gasoline Hydrogenation Unit (PGHU)
- 2) Butadiene Extraction Unit (BDEU)
- 3) Benzene Extraction Unit (BEU)
- 4) C4 Hydrogenation Unit (CHU)

In Full load condition, difficulties were experienced at NCU & BDEU units where production of P+E was going down by 2 MT./Hr. and that of Butadiene by 15 MT/Day. The above reduction was not observed in Winter months when cold water temperature was about 32-33°C.

Considering 20T per day loss during above period and assuming average contribution of Rs.20,000/T (differential Price between Butadiene & LPG), the contribution loss, HPL was facing was estimated to be Rs. 4 Lakhs/Day.

Also huge amount of power was also getting consumed on fans each having 90KW motor \* 9 Nos. for a total circulation capacity of 27000 m<sup>3</sup>/hr. Supply temperature of around 8500 M<sup>3</sup>/hr of circulation water was determined to be critical by HPL as it catered to the exchangers of main units. Hence it was decided to divert water from 3 cells of cooling tower to MCS or add 3 additional cells of cooling towers.



After studying both the proposals, HPL team visited installations of MCS at 2 plants. After getting the feedback from the client, HPL decided to go for Mist Cooling System from MREPL.

**MCS was designed, manufactured, installed and commissioned by MREPL at HPL in the year 2005. MCS is operational at HPL now for more than 1 year and the results obtained are excellent. Mist Cooling System is maintaining a constant cold water temperature of 32°C at a WBT of 31°C.**

**Hence HPL could run their plant at desired capacity in summer and monsoon months when humidity goes to 95%. Also they saved around 270 KW/HR on the fan power.**

***MCS PAY BACK PERIOD WAS LESS THAN 1 YEAR.***

**MCS has now been expanded to 12000 m<sup>3</sup>/hr due to its excellent performance at HPL.**



**ANNEXURE – B**

**MIST COOLING SYSTEM AT  
M/S. SMARTCHEM TECHNOLOGIES  
LTD., SRIKAKULAM, AP.  
(OPEN TYPE MIST COOLING SYSTEM)**



## ANNEXURE-B

### **SPECIFIC CASE STUDY OF INSTALLATION OF MCS AT M/S. SMARTCHEM TECHNOLOGIES LTD. SRIKAKULAM, AP.**

**We elaborate below a specific case study done at M/s. Smartchem Technologies Ltd., Srikakulam, AP (A div. of M/s. Deepak Fertilizers Ltd.)**

Smartchem Technologies is a Chemical Plant located at Srikakulam near Vishakapatnam in AP. They are major producers of Ammonium Nitrate and nitric acid.

They were using induced draft cooling towers of capacity 1400 M<sup>3</sup>/Hr. In summer and monsoon months when WBT was around 30°C, the outlet temperature from CT was around 34 to 35 °C.

Due to above their plant used to operate at lower efficiency as compared to winter months. Hence they decided to adopt our Mist Cooling System of capacity 700 M<sup>3</sup>/Hr, i.e. 50% of total capacity as per availability of space. MCS is now operating in conjunction with their CT. Outlet temperature from MCS is around 31°C. Due to reduction of water load on existing CT, CT outlet temperature also has come down to about 33°C as against earlier 35°C. Hence resultant temperature at the C.W. suction pit where outlet of both CT and MCS is mixing is maintained around 31.5°C as against earlier 35 °C.

The benefits achieved due to above are enclosed herewith in form of a certificate & graphs received from M/s Smartchem technologies Ltd. confirming increase in production up to 5% due to installation of MCS.

This way space requirement of MCS as compared to total capacity will definitely reduce along with reduction in capital investment also.

With the above arrangement, a combined approach of 1.5°C can be achieved as against 5°C from conventional CT.

The quantity of water to be diverted to MCS may be decided on case to case basis.

#### **STATUS :**

**MCS IS IN OPERATION AT SMARTCHEM SINCE 2004 AND GIVING VERY GOOD RESULTS. MCS PAY BACK PERIOD WAS OBTAINED IN LESS THAN 1 YEAR.**



**ANNEXURE – C**

**MIST COOLING SYSTEM AT  
M/S.BAJARANG POWER & ISPAT LTD.,(BPIL),  
RAIPUR C.G  
(LOUVER TYPE MIST COOLING SYSTEM)**



## ANNEXURE-C

### **SPECIFIC CASE STUDY OF INSTALLATION OF MCS AT M/S.BAJARANG POWER & ISPAT LTD.,(BPIL), RAIPUR C.G**

**M/s Bajarang Power & Ispat Ltd (BPIL) is a steel plant located at Raipur in Chhattisgarh. They have steel Plant and a co-generation power plant of capacity 12MW operating since year 2004.**

**In the power plant, BPIL was facing problems with existing cooling tower. During peak summer and monsoon when humidity and temperature is high (Mid April to Mid September), it was observed by BPIL that cooling water temperature was going beyond 35°C against required 32°C for TG condenser. This increase in temperature directly resulted in low vacuum at condenser. As result of this BPIL power plant was operating with low efficiency during summer and monsoon. Also huge amount of power was also getting consumed on fans. Due to frequent gear box, fan blade failure plant experienced forced shut down many times.**

**Due to above, unit was in very much trouble. They were not able to run to the rated capacity and average power output from the plant was dropped down.**

**In the year 2008 factory decided to upgrade /change the existing system enabling them to get out of the problem.**

Till then, MCS technology was well known in Raipur as it was successfully running at around 8 to 10 plants. After observing performance of MCS in these plant BPIL decided to install MCS for their plant.

MCS was designed, manufactured, installed and commissioned by MREPL at BPIL in the year 2008.





### **Mist Cooling System [MCS] :**

A constant cold water temperature of  $30^{\circ}\text{C} \pm 1^{\circ}\text{C}$  was maintained through out the season with an approach of around  $2^{\circ}\text{C}$  & temperature drop of as high as  $10^{\circ}\text{C}$  to  $12^{\circ}\text{C}$ .

Also, as MCS does not require any Fans, CT fans were totally eliminated, thus saving additional **power of about 100Kw/Hr.** Same circulation water pumps were used for MCS keeping power same.

### **Benefits Obtained are highlighted below :**

- (1) Rise in vacuum to desired level due to lower cold water temperature obtained from MCS. Thus plant could operate at its rated capacity of 12 MW + throughout the year.
- (2) The power consumed on fan is totally eliminated.
- (3) Very low maintenance as compared to cooling towers, as MCS has no moving parts and is manufactured out of special material, which is totally non-corrosive.
- (4) PAY BACK PERIOD OF LESS THAN ONE YEAR WAS ACHIEVED

### **STATUS :**

MCS is operational at BPIL now for about 2 years and the results obtained are excellent. Mist Cooling System is maintaining a constant cold water temperature of  $30^{\circ}\text{C}$  at a WBT of 28 to  $29^{\circ}\text{C}$ .

Hence BPIL could run their plant at desired capacity in summer and monsoon months. Also they saved power which was consumed by cooling tower fan

***MCS PAY BACK PERIOD CAME DOWN TO LESS THAN 1 YEAR.***