O&M CONFERENCE IPS 2013

NTPC Limited

KAHALGAON SUPER THERMALPOWER PLANT

Capacity : Stage – I  (4 X 210 MW)

Stage - II  (3 X 500 MW)

Achieving Zero Water Discharge from Main Plant
Location: Situated 30 KM away from Bhagalpur on the bank of river Ganga.

Capacity: 2340 MW (STAGE#I: 4X210 MW & STAGE#II: 3X500 MW).

Source of Coal: Lalmatia Coal Mine (30 km from NTPC Kahalgaon) & Imported Coal.

Source of Water: Raw water from river Ganga.
No discharge of liquid effluent directly or indirectly into the environment.

Environment clearance specifies that “Liquid effluents emanating from power plant, Colony, Ash Pond should be recirculated and no discharge of liquid effluent directly or indirectly will be permitted into river Ganges.”
Why Zero Discharge at NTPC Kahalgaon

- The location significance of NTPC Kahalgaon as it is situated at the very sacred river, i.e. River Ganga,

- The stretch between Sultanganj to Kahalgaon is declared as sanctuary of the National Aquatic Animal. Gangetic Dolphin.

- The regulatory authority has imposed the very stringent condition of Zero Discharge.
All Effluents from Plant Area of Stage-I (Boiler & Turbine area, workshop service building & Fuel handling area) were mixed and discharged directly into the main drain.

Now Boiler, Turbine, workshop & service building effluents are separated from Fuel handling area effluent and being recycled through LWTP-I and all the Boiler side equipments cooling water are reused in ash handling. And the effluent from fuel handling area is being routed through Oil Separation Unit.
There was no drainage network to take care the effluent from railway track.

Newly constructed trench diverting drain water of Central Store/ Steel yard and Main Plant drain to main pit of the centrifuge building.

Now All dismantled drains has been repaired & left over portion of drains constructed and connected to main plant drain to diverts the effluent from railway track.
Effluents from coal settling ponds were not recycled for Dust suppression system & were discharged to the CHP drain leading to main plant drain. The effluents from coal settling ponds are now being reused for dust suppression.

There were two nos. of service water pump used for various purposes and hence the higher quantity of effluent were generated from services. The effluent quantity has been reduced by limiting the operation of only one service water pump.

Stage -2 Ash handling system, There was no drainage network for vacuum pump sealing water, and the sealing water were directly discharge to main plant drain. Now vacuum pump sealing water are being recycled to Ash slurry pump house of stage-II.
Earlier the Firefighting lines were under ground and hence the leakages could not be identified easily leading to higher effluent in to main plant drain.

Now approx 8 KM. underground fire water line of stage-1 was replaced by overground new pipe line.

Dry ash handling system has been improved which resulted in reduced water requirement for wet ash handling and hence the reduced effluent generation from AWRS.

MINIMISING THE CONSUMPTION OF WATER IN POWER PLANT OPERATION
AFTER THE ABOVE SYSTEM BECAME OPERATIONAL, THE FINAL EXIT POINT OF EFFLUENT DISCHARGE AT EKCHARI GATE (FINAL OUTLET) WAS MONITORED BY CLOSING THE STOP LOG GATE. APPROX 1000 M3/Hr OF EFFLUENT DISCHARGE WAS OBSERVED.

**ACTION PLAN** TO RECYCLE 1000 M3/Hr OF EFFLUENT

- **MODIFICATION -1 A**: FIVE NOS. OF VERTICAL PUMP (3X75 M3/HR + 2X150 M3/HR) WERE INSTALLED OVER THE PIT AND DISCHARGED TO THE INLET OF STAGE-II CW CLARIFIER FOR TREATMENT & REUSE.

- **MODIFICATION-1B**: A NEW STOP GATE WAS INSTALLED AT THE EXIT DRAIN OF STAGE-I MAIN PLANT DRAIN SO AS TO ENSURE 100% RECYCLE OF STAGE-I MAIN PLANT & OFFICE AREA DRAIN.
FINAL STEP TOWARDS ACHIEVING ZERO DISCHARGE

- After ensuring 100% recycle of Stage-I effluent, the quantity of effluent discharge at final exit point (Ekchari Gate) was reassessed and was found to be approx. 500-700 M3/HR. This water was mainly from Stage-II Main Plant & CHP area.

- The existing platform at Ekchari Gate was utilised to construct the foundation for erecting three Nos. vertical pump (Cap. 3x250 M3/HR).

- The discharge of the pump was re-routed to the CW Clarifier inlet of Stage-II for treatment & reuse.

- After carryout the above modifications and keeping them operational, the stop log gate at Ekchari Gate was closed and no overflow of effluent was observed.

Thus achieving zero water discharge from main plant.
### Water Consumption

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<th>Year</th>
<th>Process water</th>
<th>Domestic Water</th>
<th>Cooling Water</th>
<th>Total</th>
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BENEFITS

• By recycling 1000 M3/HR of effluent and taking back into the system there is a direct saving of Rs 8.76 Lacs in terms of water cess (@ 10 paisa/ KL)

• Due to course diversion of river Ganga and very low intake of flowing fresh water from the river during dry season, the effluents got recycled thereby significantly increasing the ionic loading of raw water and rise in chemical consumption for DM water production. After achieving zero discharge, there is reduction in chemical consumption

• This has also authenticated our commitment to fulfil the statutory requirement of Bihar State Pollution Control Board to maintain zero discharge into River Ganga