Benefits of Condenser Cleaning, Cooling tower and Condenser water system cleaning and Chilled water system cleaning for operating Chilled water systems.

Condenser:

1. Condenser tubes will be descaled- All debris and scales will be removed from Condenser. Condenser pumps load will be reduced and Power and Electricity will be saved.
2. Since condenser tubes cleaned and without scales, the heat transfer ratio will be more and the flow through tubes will also be more. This will result more cooling effect in outlets.
3. Increased flow through the tubes, effective heat transfer ration and lowered Load and Power consumption will benefitted commercially and the system life too.

Cooling tower:

1. Proper on time scheduled Cooling tower Mechanical/chemical cleaning will increase the heat transfer ratio and the Pipes and tubes performance in Heat transfer process.
2. Scheduled Mechanical/chemical cleaning of the Cooling tower fills will help in formation of more system water as droplets and hence heat transfer efficiency of the system will be improved.
3. Proper cleaning of Cooling tower Basin, Walls and Fills will stop initiation of any scaling in system pipe lines and such contaminations to the system.

Chilled water system:

1. Heat Transfer efficiency will be improved and hence the cooling effect on Outlets will be high.
2. Corrosion initiations from the Chilled water system pipe lines and chiller tubes will be protected and hence pipe lines and chillers life and efficiency will be improved.
3. By removing the colloidal Iron and particles after the cleaning of chilled system water lines, the heat transfer efficiency of the system water will be high and hence the running status of chillers can be reduced. The Chillers working load will also be reduced. Hence the Power consumption and Electrical requirement also can be reduced considerably.

Why Condenser Cleaning required?

1. Normally in Initial fabrication and commissioning stages of Condenser water system (HVAC) and Condensers commissioning there should be proper Pre Commissioning cleaning as per BSRIA guidelines. But most of the systems not followed or commissioned as of this procedures. Hence During installation and prior to commissioning the system pipes and layouts will be with installation debris, Welding plugs, Dust and outside debris, Corrossive debris, Oil and paint debris etc. These all external debris will be affecting the entire chilled water system. Hence by doing Precommissioning cleaning will ensure the system life, equipments performance assurance and efficiency of the system.

Scaling on condenser tubes before cleaning

Scaling on condenser tubes before cleaning

Condenser tubes during flushing after chemical cleaning

Condenser tubes after chemical cleaning and flushing

2. Bad quality of makeup water to the cooling tower Make up water may be from Bore well or from Open wells. This water may have High hardness, TSS , Turbidity and High level of Iron. High Hardness causes Calcium Scaling on condenser tubes, pipe lines, cooling tower fills etc. This scaling will result the increased wall thickness of the tubes inside condensers and decreased flow rate through the tubes.

   Increased wall thickness will cause low heat transfer efficiency and will cause the condenser systems over working status to give the required heat transfer.
   The decreased tube diameter due to the scaling inside will cause decreased flow through the tubes and pipes. Hence for achieving the required heat transfer the pumps should work more for giving more flow and this will cause more power consumption and more expenses as electricity.

3. If proper regular chemical treatment is not implemented in Condenser system:
   If the condenser water system is not protected from Scaling , Corrosion and Microbilogical fouling all this will cause Condenser tubes scaling, Corrosion and Punctures etc. Hence if the system not protected with proper chemical treatment, the condenser cleaning needed frequently.

Why Cooling Tower system needs cleaning frequently?

Cooling tower is an open type heat transfer system. The heat transfer ratio depends on the quantity of water droplets flowing downwards from the top of the tower to the basin.

Contaminated cooling tower fills

Contamination & scaling depositions in Cooling tower fills

If the makeup water have high hardness and chlorides or the surroundings of the cooling tower is with dusty air, then the cooling tower fills and the walls will be having scaling due to this hardness, dust and the chlorides in makeup water etc.

The scaling in fills will cause channeling of the water flow from top to the basin and droplets and due to the scaling the quantity of water droplets flowing towards down will be less and it will cause low heat transfer and will cause the condenser pump's more running and hence the loss of power as electricity etc.

Why Condenser system pipe lines need to chemical cleaning and flushing?

Due to bad water quality and as the system operated without proper water treatment scaling and corrosion issues will be in the entire condenser system pipe lines including cooling tower basin, fills, Condenser and the condenser pumps.

High Hardness causes Calcium Scaling on inner surface of the pipe lines, cooling tower fills etc. This scaling will result the increased wall thickness of the tubes inside condensers and decreased flow rate through the pipes. Since the system is not getting enough flow through the pipes, the pumps will work more time with more load to achieve required cooling performance and hence Power loss as more electrical consumption resulted and will cause commercial loss.

What to do after cleaning Condenser system?

After chemical cleaning and flushing, the entire system and the condensers will be clean and the tubes surfaces and the pipes inner surfaces will be with virgin material surfaces and will gige highest heat transfer efficiency and will be benefitted as lowered pump running time, lowered pump load and increased cooling effect in system.
But even after cleaning if the system run with bad make up water and without proper water treatment, then again scaling, corrosion and other previous issues will arise again and after some months the system will have the same status as before of the cleaning process.

So the below corrective actions to be taken immediately after chemical cleaning of the condenser system and cooling towers done.

a. Testing of makeup water quality and correcting the quality to required standards to avoid scaling and corrosions
b. Adopting/ starting a proper Chemical treatment for the condenser system water and cooling towers with proper time schedules.

How often Condenser system and cooling towers to be cleaned?

If the system is protected with proper Water treatment and with proper make up water quality, the condensers will work normally and the requirement of cleaning of the condensers will be less. The equipments life and performance also will be improved. Hence the condenser cleaning stages requires only when the equipments performances affected considerably.
Since the cooling tower and the Cooling tower fills exposed to open air and atmosphere, scaling due to dust in air and algae formation due to less chemical treatment etc may occur in cooling towers. Hence it is advised to have Mechanical cleaning & Chemical cleaning to the cooling tower system and Fills within every 3 months. This will help initiation of scaling and algae formation in cooling tower and fills and it will help the entire condenser system from scaling initiation too.

Why Chilled water system cleaning needed?

Chilled water system is a closed loop. The water inside this loop is circulating all time to transfer cooling effect produced in Chillers to the AHU & FCU Units in the entire building or system. Hence the cooling effect (heat transfer) efficiency , the flow rate through the pipe lines and the Corrosion problems inside the pipe lines will affect the performance of the Cooling system, more operation time for the chillers and ultimately more power consumption, low cooling effect on outlet and more electrical consumption etc.

Scaling on Inner sides of Chilled water system pipe lines

Corrosion Inside Chiller system pipes

Depositions inside chilled water systems without cleaning and Treatment

Normally in Initial fabrication and commissioning stages of Chiller water system (HVAC) and chillers commissioning there should be proper Pre Commissioning cleaning as per BSRIA guidelines. But most of the systems not followed or commissioned as of this procedures. Hence During installation and prior to commissioning the system pipes and layouts will be with installation debris, Welding plugs, Dust and outside debris, Corrosive debris, Oil and paint debris etc. These all external debris will be affecting the entire chilled water system. Hence by doing Precommissioning cleaning will ensure the system life, equipments performance assurance and efficiency of the system.

After commissioning even the Precommissioning cleaning done, the Chilled water inside the pipelines may have Iron content and it will start Corrosion Initiations inside the inner sides of the Pipes and chiller tubes. This corroded Iron will cause scaling inside the tubes. Same time since these scales will be like a coating in inside walls of the pipes. Hence the heat transfer efficiency of the tubes will be decreased. And the scales inside the pipes will cause reduction of Diameter of the pipes and tubes. Hence the flow rate through the pipe lines will be lowered and as a result the chillers will forced to run more time with more load to attain the required cooling effect in outlets.

Also if the Chilled system water is contaminated with Iron residual (colloidal Iron) the heat transferring efficiency of the system water in to the entire system will be less than of cleaned protected Chilled water system.

How to clean and protect the operating chilled water systems from Corrosion and other problems?

The chilled water system will be protected from corrosion initiations and other issues by proper chemical cleaning and flushing as online (online with operational status) as per BSRIA guidelines with proper chemicals. After cleaning the system water should be Passivated against any corrosion initiations while system operated or standby. This can also be achieved by adding proper quantity of Corrosion preventive chemicals and doing proper makes ups on time. Once the chilled water system cleaned and Passivated normally there will not be any more corrosion initiations or other issues.

WHY AHUs & FCUs Chemical Flushing Required? (In Perticular to Hospital utility Cooling systems)

In HVAC systems AHUs and FCUs are the Air Handling portions of the HVAC system. AHU units takes fresh air from the ambient or hospital surroundings and delivers to the specified rooms/ outlets where cooling utility is required through the FCU unit. Hence any contaminations in AHU/FCU intake areas will be directly affecting the air taken through them to the utility purposes.

In hospital HVAC system's the Chilled air used in Operation Theaters and ICU units must be free any kind of Pathogens or Microorganisms contaminations.

Microbiological & Pathogenic Organisms growth in AHU Fins

Since AHU & FCU units are the Air intake & Supply units to such important areas, these units to be kept free of any Microbiological/ Pathogenic organisms contaminations. Since the Fins of AHUs and FCUs have dust and wet contaminations the chances of Microbiological growth will higher. In these condition the grown microorganisms and Pathogenic organisms will be growing faster and will be entering to the Operation Theaters and ICU units through the Cooling Air supplied to them.

As we have to keep Operation Theaters and ICU units or even the rooms of Hospitals where patients admitted without any kind of Microbiological Pathogenic contaminations (the main source considered as from air) the respective AHU/FCU units to be disinfected during cleaning. Most of cooling systems in such utilities are facilitated with UV or other Air sterilizing methods. But as the density of Microorganisms increases above the disinfective control of such units because of heavy growth in AHU/FCU unit's fins, there should have periodic disinfection of such AHU/FCU units for avoiding any such skipping of microorganisms to the Operation Theater or ICU rooms etc.

CoolEnviro is using HUWA SAN TR -25, H_2O_2 based Disinfectant and it is a bactericide, fungicide, virucide, sporicide and an algeaecide. Its composition makes it extremely powerful, as it attacks the defense system (enzymes) of the micro-organisms and the hydrogen peroxide attacks its membrane and internal organs (DNA), to give BioXeco better disinfection and multiple oxidation power.

Hence by the application of HUWASAN for AHU/FCU fins cleaning process, we assures the removal of microbiological growth in Fins and will restrict the passing of Microbiological colonies through the air to the Operation Theater and to ICU rooms etc.

HUWASAN have the power for dissolving of contaminated dust and rusted contaminations in Fins and will be clearing the Fins surfaces and disinfects the Air intake area of AHU/FCU simultaneously.