Condensate system in thermal power plant

What is a surface condenser in a thermal power plant?
In thermal power plants,the purpose of a surface condenser is to condense the exhaust steam from a steam turbineto obtain maximum efficiency,and also to convert the turbine exhaust steam into pure water (referred to as steam condensate) so that it may be reused in the steam generator or boiler as boiler feed water.

What is a condensate system in a power plant?
Swapan Basu, Ajay Kumar Debnath, inPower Plant Instrumentation and Control Handbook (Second Edition), 2019 After work is done at the turbine, the exhausted steam is cooled in the condenser to form a condensate system.

What is a condensate system in a steam turbine?
After work is done at the turbine,the exhausted steam is cooled in the condenserto form a condensate system. In addition to that,various leakages,drains,and make up finally coming to the condenser system constitute the total condensate system.

How does a condensate system work?
The condensate system includes anywhere that the steam condenses to form liquid water. As the vapor leaves the low-pressure turbine it contains droplets of water. It is passed outside of homogenated tubes in the condenser through which certain water is passed. Cooling water causes condensation of the steam to water by removing the latent heat.

What is a total condensate system?
In addition to that,various leakages,drains,and make up finally coming to the condenser systemconstitute the total condensate system. Exhausted steam is cooled at the condenser,then put into the cycle by the condensate extraction pump (CEP).

What is a condensate and feedwater system?
The Condensate and Feedwater System shown in Figures 2.6-1 and 2.6-2,is an integral part of the reactor plant regenerative steam cycle. The steam exhausted from the low pressure turbines is condensed in the main condenser and collected in the main condenser hotwell.

2013. The present paper is a case study performed at National Thermal Power Plant (N.T.P.C.), Faridabad (India). The paper illustrates the development of an availability simulation model for Condensate and Feed Water System of a thermal plant by making the performance analysis using probabilistic approach.

What are the different kinds of pumps used at power plants? Many different kinds of pumps are used in power plants to fulfill a wide range of applications. Boiler feed pumps are crucial for the operation of power plants.

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These pumps are typically multistage and deliver feedwater to boilers. An example of a multistage boiler feed pump can be seen in Image 1. ...

The power industry is installing hundreds of new condensate polishing systems as a esult of r increasingly stringent boiler feed water requirements, the need for greater power production reliability, and the demand for higher efficiency power plants. Pall Power Generation is the industry leader in providing filtration systems for power plant ...

In essence, Condensate Polishing attributes as a critical component in "Thermal Power Plants" to ensure availability, reliability, and assist in achieving optimum performance. High pressure design requirement, coupled with requirement of resin transfer for external regeneration, poses very significant hydraulic and mechanical design ...

35. Balancing Device o A small portion of the feed water in the order of about 10% which is not calculated to the guaranteed delivery capacity is taken off from the space behind the last impeller for the operation of the automatic balancing device to balance the hydraulic axial thrust of the pump rotor. o The purpose of the balancing device is to take up thrust pressure in ...

This paper provides summary of domestic in service nuclear power plant condensate polishing system (CPS) configuration, CPS is supplied for all domestic in service nuclear power plant and almost all above sub-critical fossil power plant, so condensate polishing system is necessary for PWR nuclear reactor. Based on USA industrial practice, the raw ...

Steam power plant is also known as Thermal power plant. A steam power plant converts the chemical energy of the fossil fuels (coal, oil, gas) into mechanical ... o Piping system to convey steam and water. ... The condensate is heated in the feed heaters using the steam tapped from different points of the turbine. The feed heaters may be of ...

The steam-water system of a thermal power plant is composed of a boiler steam turbine condenser high-low pressure heater condensate pump and feed water pump, etc. It includes steam-water cycle chemical water treatment and cooling system, etc. Water is heated into steam in the boiler and further heated by the heater Then it turns into ...

Various feasible solutions were proposed to solve the problems of debugging condensate polishing system in 600MW unit of Power Plant, such as unsuitable hydraulic test, poor effect of resin regeneration, imperfect program control interlock protection and so on, which ensured safe and steady operation of whole system.

The present paper is a case study performed at National Thermal Power Plant (N.T.P.C.), Faridabad (India). The paper illustrates the development of an availability simulation model for Condensate and Feed Water System of a thermal plant by making the performance analysis using probabilistic approach. The plant is

divided into many sections like Ash handling ...

The proper design of condensate system requires detail knowledge about condensate piping network, different components of the system as well as various problems associated with condensate flow both in steam and condensate pipelines.

Steam/condensate pipe size more than 8 inches (200 DN) requires a minimum of 3.5 inches (8.8 cm) of insulation. Available Materials. Plants have a number of options when it comes to insulating steam and condensate system components. Calcium silicate and mineral fiber are the most commonly used insulation types today for these components.

A reasonable specification for condensate system design is to provide a reliable and long operational life span of more than 20 years without a primary condensate system failure. Plant personnel must assume that the condensate system designs shall include reasonable maintenance and plant services.

Working Principle of a Thermal Plant. The working fluid is water and steam. This is called feed water and steam cycle. The ideal Thermodynamic Cycle to which the operation of a Thermal Power Station closely resembles is the RANKINE CYCLE.. In a steam boiler, the water is heated up by burning the fuel in the air in the furnace, and the function of the boiler is to give ...

OverviewPurposeDiagram of water-cooled surface condenserCorrosionEffects of tube side foulingOther applications of surface condensersTestingSee alsoIn thermal power plants, the purpose of a surface condenser is to condense the exhaust steam from a steam turbine to obtain maximum efficiency, and also to convert the turbine exhaust steam into pure water (referred to as steam condensate) so that it may be reused in the steam generator or boiler as boiler feed water. The steam turbine itself is a device to convert the heat in steam to mechanical power. The differe...

The main parts of Thermal Power Plant: Coal handling system; Boiler feed pumps; Boiler; Turbine; Condenser; Condensate extraction pumps; Circulating pumps; Cooling tower; Generator; FD & ID fans; ... To increase the efficiency of the boiler as well as a thermal power plant, condensate water received from the condenser is heated. These all are ...

Modern steam power plants consist of various systems that improve the entire plant operation (Li et al. 2017; Chen et al. 2017a).One such system is a condensate heating system mounted between the main condenser and steam generator (Abdella and Nassar 2019) in which the condensate is heated by steam extracted from the main turbine cylinders (Rocha ...

2 Xi"an Thermal Power Research Institute Co. Ltd., Xi"an, P. R. China ... requirements of condensate polishing in thermal power plant Part 1:Water-cooled . units ?of 1750~2000mol/m. 3 ... TPRI will estimate the factors affecting cation resin volume and working exchange capacity of CPP system in Dingzhou Power Plant.

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1. Factors affecting ...

A condensate polisher is a device used to filter water condensed from steam as part of the steam cycle, for example in a conventional or nuclear power plant (powdered resin or deep bed system). It is frequently filled with tiny polymer resin beads which are used to remove or exchange ions so that the purity of the condensate is maintained at or near that of distilled water.

Condensate polishers are resin-based ion exchange systems that are commonly used in power plant condensate systems to remove dissolved contaminants (chlorides and silica) and suspended ...

Condensate extraction pumps (CEP) extract the condensate water from the condenser and pump it through the condensate polishing system and the LP heaters to the de-aerator feed water tank. In medium to large size gas-fired combined-cycle power plants, the CEP are vertical canned type to ensure enough Net Positive Suction Head Available (NPSHA). In small power plants, the ...

The layout of nuclear power plants comprises two major parts: The nuclear island and the conventional (turbine) island.The nuclear island is the heart of the nuclear power plant. On the other hand, the conventional (turbine) island houses the key component which extracts thermal energy from pressurized steam and converts it into electrical energy, the turbine generator.

condensate polishing and have become the virtual standard for condensate polishing systems. Nuclear BWR . Although early BWR deep bed plants included regeneration systems, none are operable today and only a few were ever operated. Some plants used ultrasonic resin cleaners to remove the particulate iron oxides and then return the resins

The power plant thermal system developed by Jtopmeret is shown in Fig. 5. This system comprises built-in components, such as nodes, slabs, flow lines, cylinders, and boundaries, which play pivotal roles in establishing the thermal infrastructure. ... where the power managed by the condensate throttling system is quantitatively calculated based ...

The Condensate and Demineralized Makeup Water system, (Figure 2.6-11) consists of a series of storage tanks, transfer pumps, and demineralizers providing reactor grade makeup water to a ...

The original designs for condensate polisher systems incorporated two approaches: Deep beds of bead type ion exchange resins. Powdered ion exchange resin precoating or covering a filter element. Also use a combination ...

A thermal power station converts heat energy to electric power via steam-driven turbine: heated water turns into steam and drives a steam turbine connected to an electrical generator. After passing through the turbine, the steam is condensed in the condenser and recycled to the boiler for reheating and evaporation. ...

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Condensate System in ...

Condensing turbine is a Turbine in which the LP Turbine is connected to a condenser. To condensate the low-Pressure Steam. The condensing turbine results in maximum power generation and Increases the plant efficiency. The power output of a condensing turbine is sensitive to ambient conditions. Recirculation and Main Control Valve

Plants with partial condensate polishing capacity are often found in large conventional thermal power plants with coal/solid fossil firing systems. However, in that case, the sizing of the make-up water treatment plant necessitates proper attention to feed the main plant during start-up periods apprehending most likeliness of the presence of ...

Its Importance in Thermal Power Plant. ... Condensate pump takes suction from condenser and delivers condensate water to deaerator through main ejectors, gland coolers and L.P.heaters. ... HP Bypass Station 1:- HP/LP bypass system can handel 60% of boiler load. 2:- HPBP valve is a combined pressure reducing and desuperheating station valve 3 ...

Thermal power plants are required to take part in the province"s peak-load regulation in order to develop the nation"s clean energy base. This research examines the operating loads of twenty-one units in the Province over a 12-month period. ... With boiler make-up water, oxygen-rich air is injected to the condensate system. The make-up ...

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