“GUJARAT STATE ELECTRICIY CORPORATION LTD”

A SUMMER INTERNSHIP REPORT

Submitted by

MARVADI JIGNESH SANJAYBHAI – 220280119071

MISHRA HARSHKUMAR BRAHMDEV – 220280119077

PATEL HARSHAL RAYUBHAI - 220280119095

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Marvadi Jignesh Sanjaybhai – 220280119071

Mishra Harshkumar Brahmdev – 220280119077

Patel Harshal Rayubhai - 220280119095

L. D. College of Engineering

CHAPTER 1: INTRODUCTION OF GSECL

1.1 Company Overview

Fig.1.1

Gujarat State Electricity Corporation Limited (GSECL) is a government-owned power generation company operating under the Gujarat Urja Vikas Nigam Limited (GUVNL). It was incorporated in **August 1993** as part of the restructuring and unbundling of the Gujarat Electricity Board (GEB) to improve operational efficiency and promote focused development in the power sector.

GSECL is responsible for electricity generation in the state of Gujarat through various thermal, hydroelectric, gas, and solar power stations. It plays a crucial role in ensuring uninterrupted power supply to industries, commercial sectors, agriculture, and domestic consumers across Gujarat.

1.2 GSECL Gandhinagar Thermal Power Station (GTPS)

The **Gandhinagar Thermal Power Station (GTPS)** is one of GSECL's oldest and most critical coal-based power generation facilities. Located near the state capital Gandhinagar, it supplies electricity to major cities including Ahmedabad and also supports industrial belts nearby.

Key Highlights of GTPS:

Parameter	Details
Type	Coal-based Thermal Power Plant
Location	Gandhinagar, Gujarat
Installed Capacity	~630 MW (3x210 MW)
Fuel	Bituminous/Sub-bituminous Coal
Power Cycle Used	Rankine Cycle
Cooling Method	Closed-cycle with Cooling Towers
Operational Since	1977 (with upgrades over time)

GTPS is equipped with modern control systems and pollution control units such as Electrostatic Precipitators (ESP) and ash handling systems to ensure environmental compliance.

1.3 Mission and Objectives of GSECL

- To generate electricity efficiently, economically, and sustainably.
- To expand generation capacity using both conventional and renewable energy sources.
- To implement best practices in plant maintenance and operation.
- To promote energy conservation and innovation in the power sector.

1.4 Scope of Work and Divisions at GTPS

During the internship, the following **four major divisions** of the Gandhinagar plant were explored:

1. **Turbine Section** – Energy conversion from high-pressure steam to mechanical and then electrical energy.
2. **Boiler Section** – Steam generation using coal combustion and heat exchange.
3. **Coal Handling Section** – Managing coal from unloading to feeding into boilers.
4. **Ash Handling Section** – Removal and management of fly ash and bottom ash.

Each department plays a key role in the Rankine cycle of thermal power generation. The plant uses DCS (Distributed Control System) for real-time monitoring and control of processes.

1.5 Organization Structure

The organization at GTPS follows a structured hierarchy ensuring smooth operation, safety, and efficiency:

Managing Director (GSECL)

|

Chief Engineer (Plant Head)

|

Superintending Engineer (Department Head)

|

Executive Engineers

|

Assistant Engineers

|

Junior Engineers and Operators

|

Technicians and Workers

This hierarchy ensures accountability, communication, and coordination between various functional units in the plant.

1.6 Plant Layout

GTPS follows a linear layout:

- **Coal Yard → Coal Crusher → Boiler → Turbine → Generator → Cooling Towers → ESP → Ash Handling System**

This layout ensures uninterrupted flow of fuel, steam, and power conversion with minimum energy losses and space optimization.

CHAPTER 2: Turbine Section

2.1 Introduction to Turbine System

The turbine section is a critical part of the thermal power plant where **thermal energy from high-pressure steam** is converted into **mechanical energy**, which is then transformed into **electrical energy** using a generator. In the Rankine cycle, the turbine acts as the main energy conversion unit.

At **GSECL Gandhinagar**, the steam turbine operates on the **condensing type, multi-stage reaction principle**, consisting of **High Pressure (HP)**, **Intermediate Pressure (IP)**, and **Low Pressure (LP)** turbine stages, connected on a common shaft coupled with an electric generator.

2.2 Working Principle of the Steam Turbin

The steam turbine at GSECL Gandhinagar operates on the **Reheat Rankine Cycle**, which enhances efficiency by reheating steam after its first expansion.

The working process is as follows:

1. **High-pressure, superheated steam** (around 130 kg/cm² and ~540°C) is sent from the **boiler superheater** to the **High-Pressure (HP) turbine**.
2. After partial expansion in the HP turbine, the steam's pressure and temperature drop.
3. This partially expanded steam is then routed back to the **boiler's reheater section** through **Hot Reheat (HRH) pipes**.
4. In the **reheater**, the steam is heated again to approximately the same temperature (~540°C) but at a lower pressure.
5. The **reheated steam** then enters the **Intermediate Pressure (IP) turbine**, where it undergoes further expansion.
6. After passing through the IP stage, it flows into the **Low Pressure (LP) turbines**, expanding further and doing additional work.

7. Finally, the steam exhausts into the **condenser**, where it is cooled and converted back into water for reuse in the cycle.

This reheat process helps maintain the **average temperature of heat addition**, reduces **moisture content at turbine exhaust**, and increases **overall thermal efficiency**.

2.3 Additional Note on Pressure Conversion

After reheating, steam pressure is **reduced step-by-step** as it passes through the IP and LP turbines:

- From **Intermediate Pressure** (~40–50 kg/cm²)
- To **Low Pressure** (<1 kg/cm² or even vacuum) at the condenser

This pressure drop across stages results in the **conversion of thermal energy into mechanical work** on the turbine shaft, which then drives the generator to produce electricity.

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Fig.2.1

Fig.2.2

2.3 Components of the Turbine Section

1. **High Pressure (HP) Turbine** – Receives high-energy steam and begins the expansion process.
2. **Intermediate Pressure (IP) Turbine** – Handles reheated steam for secondary expansion.
3. **Low Pressure (LP) Turbine** – Final expansion stage before steam is sent to the condenser.
4. **Main Steam Line** – Transfers steam from the boiler to the turbine.
5. **Reheater** – Located in the boiler, it increases the temperature of steam between HP and IP stages.
6. **Condenser** – Converts exhaust steam into water using cooling water from cooling towers.
7. **Generator** – Converts mechanical shaft rotation into electrical energy.

8. **Exciter** – Supplies field current to the generator.

9. **Bearings & Lubrication System** – Reduces friction and supports the turbine shaft.

10. **Governing System** – Controls the turbine speed and steam flow using control valves

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2.4 Turbine System Flow (Explained from Diagram)

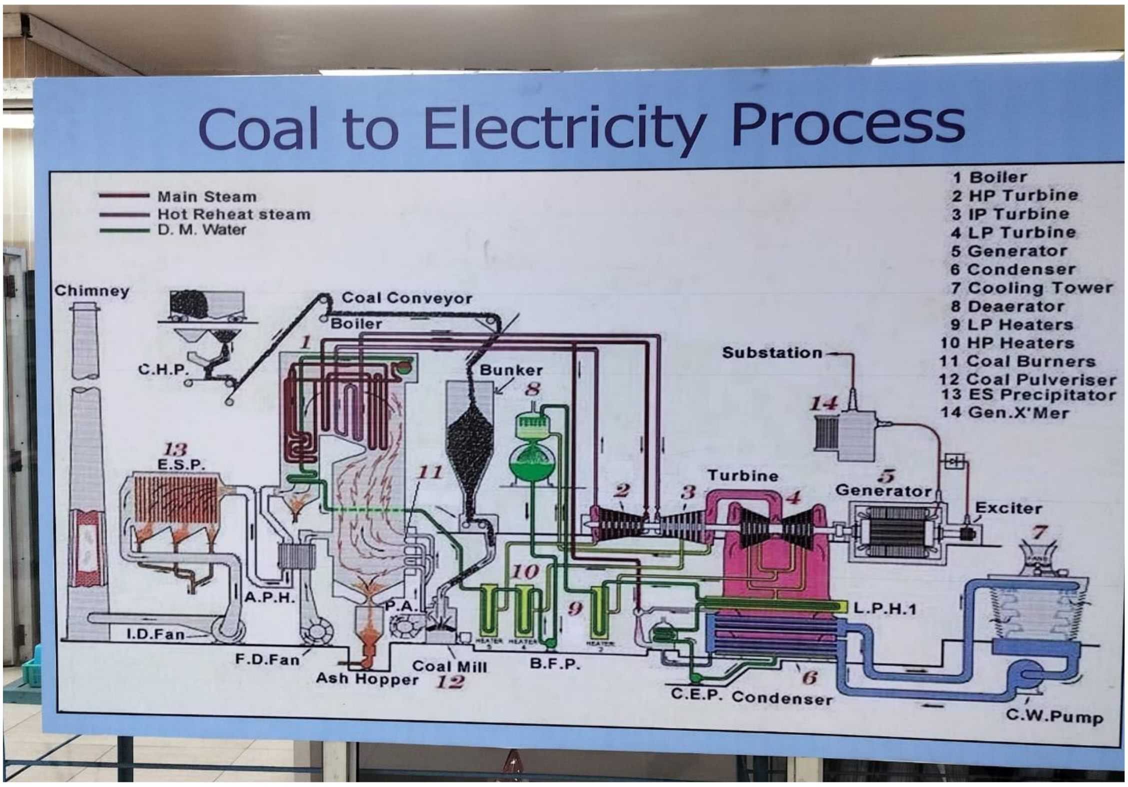

Fig.2.3

Based on the **first diagram ("System Flow Diagram – Gandhinagar Thermal Power Station")**, the turbine cycle can be explained as:

- **Boiler & Superheater**: Generates high-pressure, superheated steam.
- **Main Steam Line**: Directs steam to the **HP turbine**.
- **Steam Turbine**: Steam expands through HP, IP, and LP stages.
- **Generator**: Converts mechanical energy into electrical energy.
- **Exciter**: Provides excitation current to the generator.

- **Condenser**: Cools the exhaust steam.
- **Cooling Tower & CW Pumps**: Circulate water to absorb heat in the condenser.
- **Condensate Pumps**: Send the condensate to low-pressure heaters.
- **Deaerator & Feed Water System**: Prepares and sends water back to boiler.

2.5 Observations During Internship

- Steam turbines were controlled via **centralized DCS panels**.
- **Steam parameters** were closely monitored (pressure ~130 kg/cm², temperature ~540°C).
- **Lubrication and vibration monitoring systems** ensured safe operation.
- **Safety trip mechanisms** were explained, such as overspeed trip, low vacuum trip, and turbine bearing temperature trip.
- Load sharing between units was automated and supervised from the **control room**.

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CHAPTER 3: BOILER MAINTAINANCE DEPT.

3.1 Introduction to Boiler Operation

The boiler is the most critical unit of any thermal power plant, responsible for the generation of **high-pressure, high-temperature steam** from water by burning fuel—in this case, **pulverized coal**. The steam produced is used to run the steam turbines, which in turn drive the generator to produce electricity.

At **GSECL Gandhinagar**, the plant uses **pulverized coal-fired water tube boilers**, designed to operate on the **Rankine cycle with reheat**. The plant follows a dry-bottom furnace configuration with vertical tube arrangements and integrated reheaters and superheaters.

3.2 Major Components of Boiler System

Based on the **sectional drawing** you provided, the following are the key components of the boiler:

◇ **1. Furnace / Combustion Chamber**

- The space where **pulverized coal and preheated air** are injected and burned.
- Lined with **water wall tubes** that absorb heat and start converting water to steam.

◇ **2. Water Wall Tubes**

- Surround the furnace walls.
- Carry water that absorbs radiant heat to form **saturated steam**.

◇ **3. Boiler Drum**

- Acts as a **separator** of steam and water.
- Receives a mixture of steam and water from the water walls.
- Directs steam to the superheater and recirculates water back to the furnace.

◇ **4. Superheater**

- Converts **saturated steam** into **superheated steam** (~540°C) to drive the **HP turbine**.
- Consists of primary and final stages, located in the upper radiant and convection zones.

◇ **5. Reheater**

- Reheats steam that has partially expanded in the **HP turbine** before it enters the **IP turbine**.
- Located in the **middle convective zone** of the boiler.
- Receives steam via **HRH (Hot Reheat) lines**.

- **6. Economizer**
  - Utilizes the remaining heat in the flue gases to **preheat the feed water** before it enters the boiler drum.
  - Increases overall thermal efficiency.
- **7. Air Preheater (APH)**
  - Recovers heat from flue gases to warm incoming combustion air.
  - Enhances fuel-air mixing and combustion efficiency.
- **8. Forced Draft (FD) and Induced Draft (ID) Fans**
  - **FD Fans**: Force atmospheric air into the furnace through the APH.
  - **ID Fans**: Pull flue gases out of the furnace and maintain negative pressure.
- **9. Safety Valves and Mountings**
  - Prevent over-pressurization.
  - Include pressure gauges, level indicators, steam traps, and blowdown valves.

3.3 Working Principle of Boiler

1. **Coal Yard Storage**
   - Coal is received via wagons or trucks and stored in the **coal yard**.
   - From the yard, it is transported through **conveyor belts** to the **crusher house**.
2. **Crusher House**
   - Coal is passed through **vibrating feeders** into **crushers**, where it is broken down into smaller pieces suitable for combustion or pulverizing.
3. **Coal Bunkers (6 per Boiler)**
   - Crushed coal is lifted and stored in **six bunkers** per boiler using bucket elevators or conveyor systems.
   - Each bunker supplies coal to a dedicated pulverizer and burner set.
4. **Hoppers and Pulverizing Mills**
   - From the bunkers, coal falls into **hoppers**, which feed the **pulverizing mills**.
   - These mills convert coal into **fine powder (pulverized coal)**, ensuring better combustion.
5. **Coal Injection to Boiler**

- Using **high-velocity Primary Air (PA) fans**, pulverized coal is carried through **pipes** (usually four per boiler corner) and injected into the **furnace corners**.

6. **Burner Configuration**
   - Each of the **four corners of the boiler** has **six coal injection pipes**, making a total of **24 coal pipes per boiler**.
   - **Ignition guns** (one per two coal pipes) are placed to ignite the coal-air mixture during startup or flame failure.

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3 Auxiliary Fuel System (LDO & Furnace Oil)

- **Light Diesel Oil (LDO)** and **Furnace Oil (FO)** are used as **auxiliary fuels** during startup or flame stabilization.
- These oils are stored in **dedicated tanks** and supplied through **fuel pumps and nozzles** to the burners.
- Once the desired **temperature and pressure** (~540°C, 130 kg/cm²) are reached, the system fully switches to **coal-based combustion**.

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4 Diagram-Based Understanding

Although not provided in this section, your previously shared diagram ("Coal to Electricity Process") shows:

- **Coal bunkers and feeders**
- **Coal mills**
- **PA fan pipelines**
- **Burner positions in the furnace**
- **Ash path after combustion**

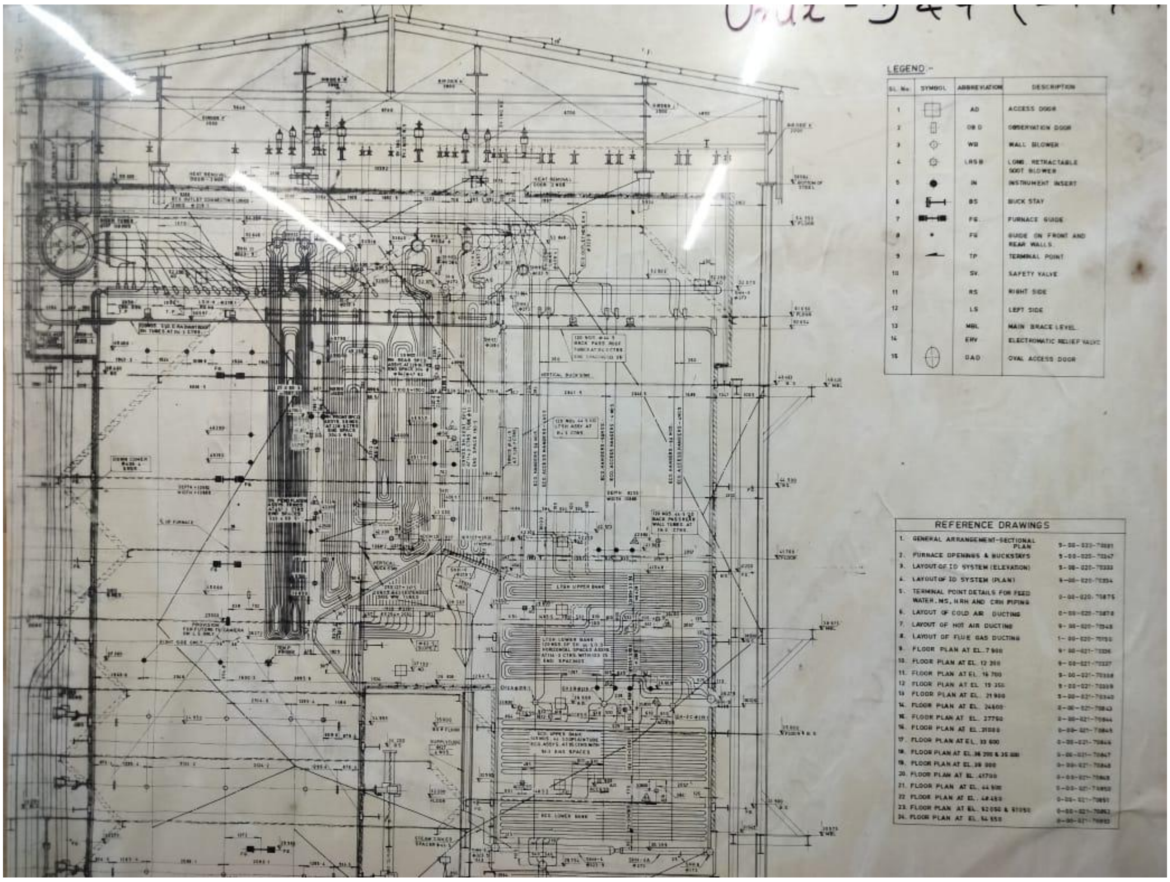

Fig.3.1

3.4 Observations During Internship

- The boiler used **bituminous coal**, stored and pulverized on-site.
- The water quality was maintained using **demineralization (DM) plant** for scaling prevention.
- The flame was visible via sight glasses; controlled using **fuel-air control valves**.
- The **APH was rotary type**, and cleaning was done periodically with steam soot blowers.
- Operators used **SCADA/DCS** to manage every aspect of boiler operation from the control room.

3.5 Combustion Air & Ash Removal System

3.7.1 Combustion Air Supply System

Efficient combustion requires a steady and clean supply of preheated air to mix with pulverized coal inside the boiler. This system includes **air filters**, **forced draft (FD) fans**, and the **air preheater (APH)**.

- **Air Filter:** Removes dust and impurities from the atmospheric air before it enters the system.
- **Forced Draft (FD) Fan / Blower Fan:** Pushes clean air into the **Air Preheater** and subsequently into the furnace.
- **Air Preheater (APH):** Transfers heat from outgoing flue gases to incoming combustion air, improving efficiency.
- The **preheated air** mixes with pulverized coal and is injected into the furnace via **24 coal pipes** (6 per corner).
- **Secondary air**, also preheated, may be used for flame shaping and stabilizing.

This system ensures **optimal air-to-fuel ratio**, reduces unburnt carbon, and supports efficient combustion.

3.7.2 Soot Blower System (Ash Removal from Boiler Walls)

During combustion, **soot and ash** particles accumulate on boiler walls, superheaters, and economizer tubes. These deposits reduce heat transfer and increase the risk of overheating or corrosion.

To clean these deposits, the plant uses **Soot Blowers**, powered by either **instrument air** or **high-pressure steam**:

- **Soot Blower Types:**
    - Wall-mounted retractable blowers
    - Long retractable blowers (superheater/reheater zones)
    - Rotary blowers (economizers)
    - Manual lance-type air/steam injectors
- **Instrument Air Blower** supplies compressed air, while **Steam Soot Blowers** use steam tapped from the boiler.
- Blowing is performed at regular intervals or automatically via **DCS** monitoring based on temperature/pressure feedback.

This system ensures **clean heat transfer surfaces**, prevents **slag formation**, and maintains **boiler performance and efficiency**.

3.6 DM (De-mineralized) Water Plant

In a thermal power plant, the **quality of feedwater** plays a critical role in maintaining **boiler life**, **heat transfer efficiency**, and **overall performance**. **DM water** (De-mineralized or depurified water) is used in boilers to prevent **scaling, corrosion**, and **deposit formation**, which can damage boiler tubes and turbines.

At **GSECL Gandhinagar**, the **DM water plant** treats raw groundwater and removes dissolved salts and minerals using a series of filtration and ion-exchange processes.

3.8.1 DM Water Treatment Process Flow

The water treatment system works in the following sequence:

1. **Raw Water Collection from Borewells**
   - Raw water is drawn from multiple **borewells** and collected in a **raw water sump**.
   - This water contains suspended particles and dissolved ions (calcium, magnesium, chlorides, sulfates, etc.).
2. **Pressure Sand Filter (PSF)**
   - Removes suspended solids, turbidity, and fine particles.
   - Works as the primary mechanical filter.
3. **Activated Carbon Filter (ACF)**
   - Removes **organic matter**, **odor**, and **chlorine** content from the water.
   - Ensures safe and clean water for ion exchange tanks.
4. **Cation Exchange Tank**
   - Exchanges **positively charged ions (Ca^{2+}, Mg^{2+}, Na^{+})** with **H^{+} (hydrogen ions)**.
   - Uses **strong acid cation resin**.
5. **Degasser Tower**
   - Removes **CO_2 gas** formed when HCO_3^- (bicarbonate) reacts in the cation bed.
   - Air is passed through water to strip CO_2 and reduce acidity.
6. **Degasser Tank**
   - Collects degassed water for temporary holding before the next stage.
7. **Anion Exchange Tank**
   - Exchanges **negatively charged ions (Cl^-, SO_4^{2-}, NO_3^-)** with **OH^- (hydroxide ions)**.
   - Combines with H^+ from the cation exchanger to form **pure water (H_2O)**.
8. **Mixed Bed Unit**

  - A final polishing unit with a **mixture of cation and anion resins**.
  - Removes any remaining ions to achieve **conductivity of <0.1 µS/cm**.
  - Produces ultra-pure DM water suitable for high-pressure boilers.

9. **DM Water Storage Tank**
   - Treated water is stored here before being pumped to the **boiler feedwater system**.

3.8.2 Importance of DM Water in Boiler Operation

- Prevents **scaling and deposit formation** on boiler tubes.
- Reduces **corrosion** in high-temperature, high-pressure environments.
- Ensures **consistent steam quality** for turbines.
- Minimizes **maintenance costs** and extends boiler life.

CHAPTER 4: COAL MAINTAINENCE DEPT.

4.1 Introduction

Coal is the primary fuel used in thermal power plants for steam generation. The **coal handling system** is responsible for receiving, storing, crushing, sampling, and conveying coal to the **boiler bunkers**. At **GSECL Gandhinagar**, an advanced automated system ensures reliable, efficient, and dust-free coal movement from the **wagon tippler** to the **boiler furnace**.

The system is composed of mechanical and electrical components including **tipplers, crushers, conveyors, stackers, reclaimers, feeders**, and **control towers**.

4.2 Coal Flow Process Description

Step 1: Coal Unloading at Wagon Tippler

Fig.4.1

- Coal is brought in railway wagons.
- **Wagon Tippler No. 3** and others unload coal by tilting wagons.
- Coal falls into the **track hopper** below.

Step 2: Primary Screening and Crushing

- Coal from the hopper is passed through a **Paddle Feeder (PF)**.
- Then it enters a **Roll Crusher (RC)** or **Ring Granulator (R.G.)**, reducing lump size.

Step 3: Metal and Magnet Separation

- Coal moves via conveyors and passes through:
  - **Metal Detectors (M.D.)** – remove large metal parts.
  - **Inline Magnetic Separator (I.M.S.)** – removes ferrous particles.

Step 4: Coal Conveying and Sampling

- Crushed coal is conveyed via **Belt Conveyors (CONV)**.
- At junction points like **Transfer Tower 2**, coal is routed as required.
- **Sampling System (S.S.)** and **Sample Collector (S.C.)** are used for quality control.

Step 5: Coal Stocking

- Excess coal is moved to **Coal Stockpile Yards** using:
  - **Stacker/Reclaimer (ST/RE)** machines.

- **Traveling Tripper (TTR)** for distributing coal uniformly.

Step 6: Reclaiming and Bunker Feeding

- When needed, coal from the stockpile is reclaimed via **Reclaimers**.
- It is directed to **Junction Towers**, then to the **Boiler Unit Bunkers**.
- Bunkers feed coal to mills for pulverizing and combustion.

4.3 Equipment & Short Forms (from diagram legend)

Abbreviation	Full Form	Function
PF	Paddle Feeder	Pushes coal from hopper to conveyors
RC	Roll Crusher	Breaks coal lumps into smaller sizes
R.G.	Ring Granulator	Secondary crusher
M.D.	Metal Detector	Detects metal objects in coal stream
I.M.S.	Inline Magnetic Separator	Removes ferrous materials
CONV	Conveyor	Transports coal
T.T.	Transfer Tower	Directional transfer and routing junctions
TTR	Traveling Tripper	Evenly distributes coal in bunker/stockpile
ST/RE	Stacker / Reclaimer	Stocks and recovers coal from stockpiles

Abbreviation	Full Form	Function
J.T.	Junction Tower	Connects multiple conveyors or routes
BF	Belt Feeder	Controls coal feed rate
A.F.	Apron Feeder	Handles heavy coal at hopper exit

Fig 3.1 – Control Panel Diagram of Coal Handling System

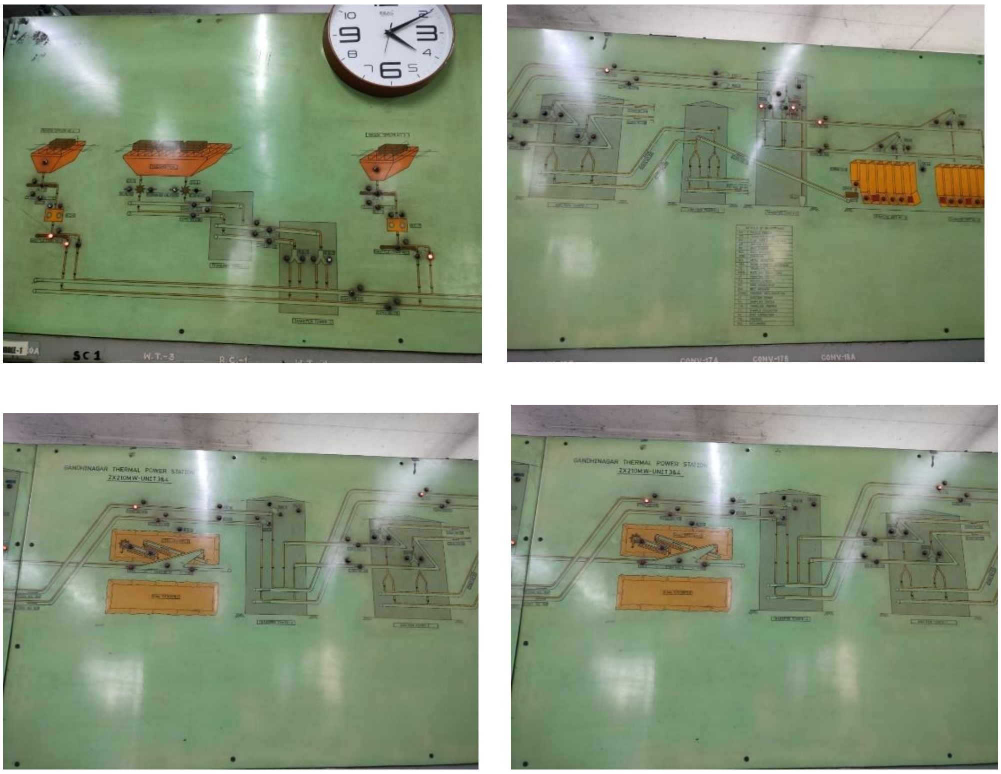

Fig.4.2

3.4 Control and Automation

- The entire coal movement is monitored from the **central control room** using a **SCADA-based panel**.
- Operators monitor:
  - Motor status (on/off)
  - Belt speed
  - Transfer line health
  - Coal flow indicators
- **Safety Interlocks** ensure emergency shutdowns in case of overloading or equipment failure.

3.5 Observations During Internship

- The coal path is divided into multiple **Transfer Towers (1–5)** and **Conveyor Routes**.
- **Each boiler unit** has **dedicated bunkers**, ensuring uninterrupted combustion supply.
- Proper sequencing of **sampling → crushing → stacking → reclaiming** is followed with minimal manual intervention., **Dust extraction units** reduce environmental pollution during crushing and conveying.

CHAPTER 5: ASH MAINTAINANCE DEPT.

5.1 Introduction

In coal-fired thermal power plants, about **30–40% of coal** remains as **ash** after combustion. This ash needs to be removed continuously to maintain boiler efficiency, prevent clogging, and meet environmental regulations. The ash produced is classified as:

- **Fly Ash** – fine ash particles carried with flue gases
- **Bottom Ash** – heavier ash particles collected at the furnace bottom

At **GSECL Gandhinagar**, an advanced ash handling system is installed, comprising **Electrostatic Precipitators (ESP)**, **ash hoppers**, **slurry tanks**, **pumps**, and **fly ash silos** for collection, disposal, and transportation.

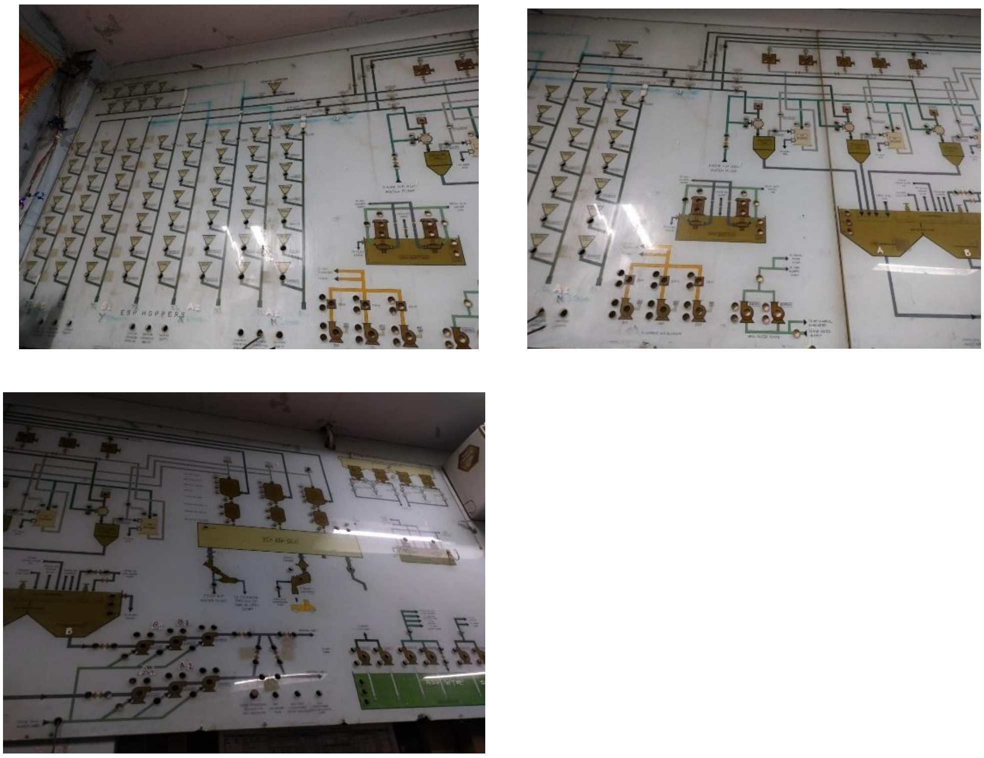

Fig.5.1

5.2 Ash Collection Zones

1. **Fly Ash Collection**
   - Fly ash is collected at the bottom of **ESP hoppers** and **economizer hoppers**.
   - ESPs use high-voltage static electricity to capture ash particles from flue gases.
   - The collected fly ash is stored temporarily in **fly ash hoppers**.
2. **Bottom Ash Collection**
   - Bottom ash is collected from the **furnace hopper** at the base of the boiler.
   - It is more coarse and heavier than fly ash.

5.3 Ash Disposal and Handling System

Based on the panel image, here's the process layout:

◇ **Step 1: Hopper Collection**

- Ash falls into hoppers from ESPs and the boiler.
- Hoppers are periodically emptied using **ash discharge valves**.

◇ **Step 2: Slurry System**

- Collected ash is mixed with water to form a slurry.
- Water is supplied by **HP (High Pressure) water pumps** or **seal water pumps**.
- The slurry is then pumped into **slurry tanks (A1, A2, B1, B2)**.

◇ **Step 3: Ash Slurry Pumps**

- Heavy-duty **ash slurry pumps** transfer the slurry from the tanks to:
  - **Ash slurry lines**

- **Ash disposal area / ash dyke / pond**
- Some portion may be reused in **cement or construction industries**

◇ **Step 4: Fly Ash Dry Collection**

- Fly ash can also be sent to **fly ash silos** via **pneumatic conveying**.
- From the silos, dry fly ash is loaded into **tankers or trucks** for commercial sale or safe disposal.

5.4 Environmental Considerations

- Ash handling is done in a **closed system** to reduce dust pollution.
- **Dust suppression systems** and **ash water recycling** help meet environmental standards.
- The plant may also utilize **dry ash disposal** for ESP ash to reduce water use.

5.6 Observations During Internship

- **ESP units** were operating on all running units with frequent ash evacuation cycles.
- Operators monitored the **valves and pumps** from the ash handling control panel.
- **Slurry pipelines** were cleaned periodically to prevent blockages.
- **Fly ash silos** were being filled regularly and fly ash was being dispatched via tankers.
- **Water usage** for slurry was optimized through feedback loops and recycled water systems.

Here is a well-structured **Summary** for your **Summer Internship Report** at **GSECL Gandhinagar**, covering all five chapters in brief and highlighting your learning outcomes.

Summary

The 15-day summer internship at **Gujarat State Electricity Corporation Limited (GSECL), Gandhinagar Thermal Power Station**, offered a practical and immersive exposure to large-scale thermal power generation. This internship provided in-depth knowledge of various core departments, including **Turbine**, **Boiler**, **Coal Handling**, **Ash Handling**, and **DM Water Plant**.

In the **Turbine Section**, I understood the operation of multi-stage steam turbines based on the **Reheat Rankine Cycle**. The process involved high-pressure steam expansion, reheating through HRH lines, and subsequent expansion in intermediate and low-pressure turbines before condensation. Observing live turbine control and safety systems broadened my understanding of thermal-to-mechanical energy conversion.

The **Boiler Section** introduced me to the heart of steam generation. I explored the internal layout including **water walls**, **superheaters**, **reheaters**, **economizers**, and **air preheaters**. The process of coal combustion, heat absorption, and superheating was explained in detail. I also learned about auxiliary systems such as **FD fans**, **air filters**, and the **soot blower system** used for ash removal from heat surfaces.

The **Coal Handling Section** detailed the complete coal journey—from unloading via **wagon tipplers**, through crushing and metal separation, to bunker feeding. Real plant control panel diagrams showed the roles of **paddle feeders**, **conveyors**, **ring granulators**, **magnetic separators**, and **stacker/reclaimers**. I understood how automation and SCADA systems maintain consistent coal flow to the boiler.

In the **Ash Handling Section**, I observed how both **fly ash** and **bottom ash** are collected, transported, and disposed of using a slurry system. The process includes ESP hoppers, ash water mixing, slurry tanks, ash slurry pumps, and **fly ash silos** for dry collection. This taught me the importance of environmental control and waste management in power plants.

Lastly, in the **DM Water Plant**, I learned about the critical role of ultra-pure water in maintaining boiler and turbine life. The plant process—from raw water through **PSF, ACF, cation and anion exchange tanks, degasser towers**, to **mixed bed polishing**—ensures that the feedwater meets high-quality standards to avoid scaling and corrosion.

This internship bridged the gap between theory and practical application in mechanical and thermal systems. It enhanced my technical knowledge, understanding of power plant operations, and appreciation for energy efficiency, safety, and environmental compliance.
