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The journey of Black Gold from Coal Mining to Power Plant at Thar Block II

During current pandemic situation Thar Team is effectively managing all coal mining and power plant operations ensuring essential power fed to the national grid.

Hafiz Tariq Usman Zafar Ali Iqtidar

Sindh Engro Coal Mining Company (SECMC) an exemplary public private partnership, successfully operates the first ever open pit coal mine of Pakistan in Thar, Block II.

Exploitation of coal ultimately leads to the generation of 660MW from the power plant which is also operated by Engro Powergen Thar Limited (EPTL). SECMC and EPTL achieved their COD on July 10, 2019 by completing all the test and inspection processes, currently mine is in the phase of advancement towards west wall with coal production of 11,000-12,000 tons/day.

Even in current pandemic situation Thar Team is effectively managing all coal mining and power plant operations ensuring essential power fed to the national grid. The coal supply is the backbone of power generation, it is essential to supply the coal as per the requirement and need of power plant.

Geological nature and inherent quality of coal are the main factors which controls the quality of supplied material. Stratigraphically, coal bearing Bara Formation of Paleocene to Early Eocene age unconformably overlies on the Granitic Basement of Pre-Cambrian age.

Bara Formation consist of coal with interbedded claystone/carbonaceous clay and sandstone. Alluvial Deposit of sub-recent age unconformably overlain by Dune Sand and overlies on Bara Formation. Alluvial Deposit consist of dominantly silty claystone, siltstone and sandstone. Dune Sand of recent age is the topmost unit and mainly consist of Sand with minor silt.

Groundwater is present in three horizons named as: Dune Sand Aquifer (1st Aquifer), Coal Seam Roof Aquifer (2nd Aquifer) and Coal Seam Floor Aquifer (3rd Aquifer). Coal Seam Roof and Floor Aquifers are confined aquifers and Dune Sand Aquifer are phreatic aquifer.

Due to the presence of aquifers beneath the earth, dewatering becomes a backbone of the project. Till date 27 peripheral dewatering wells and 06 in-pit wells are in operation with additional setup of surface drainage pumping station in mine which have the pumping capacity of 1800-1900 m3/hr. Sand which extracted from 2nd

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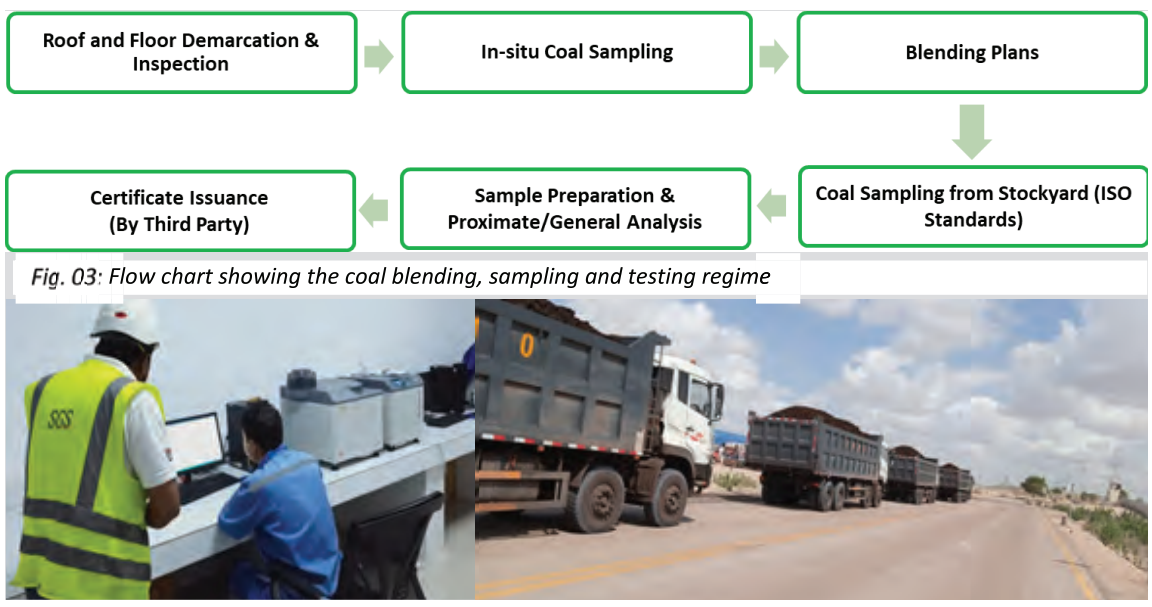

Fig. 03: Flow chart showing the coal blending, sampling and testing regime

Why Coal-Based Energy

The major consumers of coal as the primary fossil fuel in Pakistan are railways, cement, fertilizer and power plants. There are 17 coalfields in Pakistan located in Punjab, Sindh and Balochistan.

By Shujauddin Qureshi, Zeenia Shaukat

The electricity crisis in Pakistan has been a major political agenda during the time period of 2005-2014 when the electricity shortfall reached its peak. A combination of factors including the declining state investment in power generation, failure to pay circular debt and rising electricity consumption on the back of a consumer-led economy promoted by General Musharraf's military government landed the country in a crisis where electricity shortfall exceeded one-third of the peak demand, at 7,000 MWs in 2013.

Electricity crisis was a major distress for the Peoples Party Government that took power in 2008 and subsequently election manifesto of the Nawaz Sharif Government that was elected in 2013. Apart from prioritising energy in the CPEC package, the Sharif government – through coal, hydropower and renewable sources - managed to add 30% to the installed electricity capacity taking it to 29,573 MW in 2018 (from 22,812 in FY 2012-13). The government also increased the share of the government in Gross Fixed Capital Formation (GFCF) in electricity generation and distribution.

Need for Coal-Based Energy

According to the Pakistan Energy Yearbook 2015, coal contributed 7% of energy supplies of the country, by source. Pakistan

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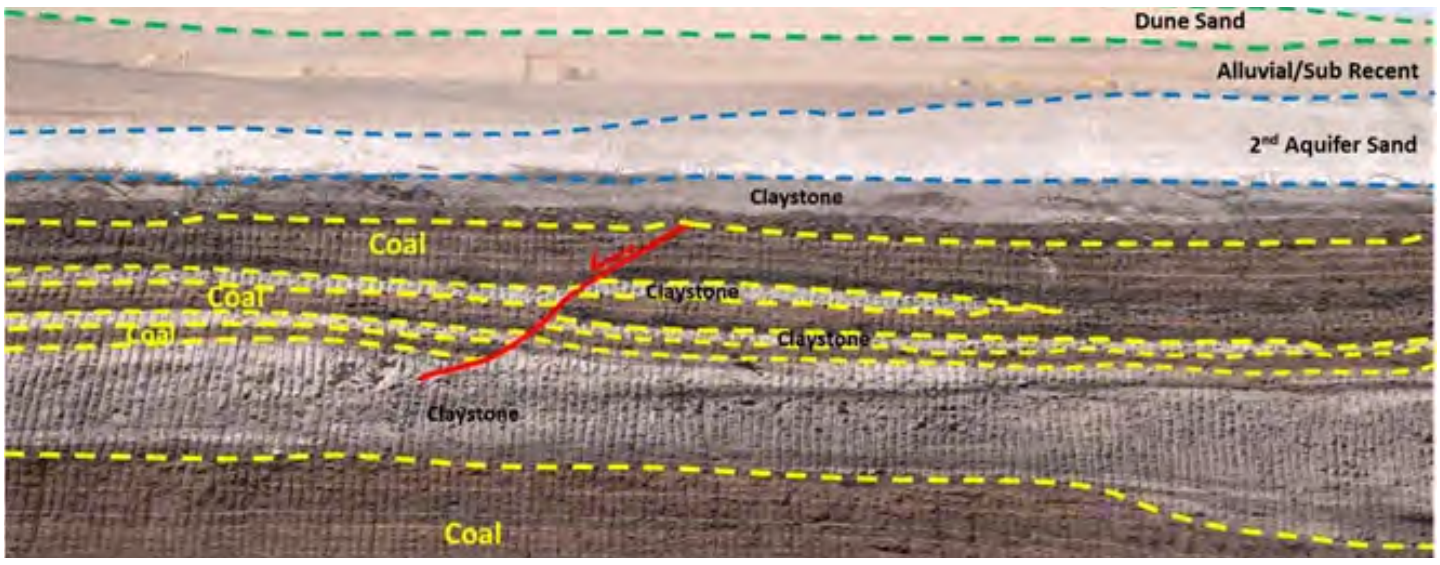
From page 1: The journey of Black Gold from Coal Mining to Power Plant at Thar Block II



Aquifer has been also used for the maintenance of haul and surrounding roads.

Coal bearing Bara Formation is 60 to 80 m thick. The Coal layers in Bara Formation are divided in different layers based on their thicknesses and elevation. These coal layers are interbedded with claystone/carbonaceous clay.

In addition, sand lenses are also reported in this region. Three different terms are being used to classify the waste and coal in mine, "CL" is used for coal, "Interburden-IB" is used for interbedded claystone/waste which has the thickness of >0.5 m and "parting" is used for those interbedded claystone which has thickness of <0.5 m.

Coal layers in Thar Block II Region start from-62 AMSL till -115 AMSL with interbedded claystone/carbonaceous clay. Average cumulative thickness of coal seam is about 25-30 m. Each coal seam possesses different quality parameters which indicated fluctuation in paleo-environment.

Due to variation in coal quality parameters, coal blending and sampling become a backbone of coal supply operations.

Coal blending helps to utilize the maximum resource from mine with keeping all quality parameters in range. Mine has achieved their design depth and successfully extracted the last coal seam from the designed pit shell and currently in the phase of advancement toward west wall.

SECMC follow the robust coal blending, sampling and testing regime to produce and supply on-spec coal to power plant. Mine geology also a main factor which is being covered by the coal Mining Team as well.

The journey of black gold (coal) from Mine to Power Plant goes through by several screening processes such as: coal seam roof and floor demarcation and inspection, in situ sampling of coal seam, blending plants, sampling of coal from stockyard after crushing, proximate/general analysis and certificate issuance.

Roof and floor demarcation of coal seam is the first step from which the quality of coal has been controlled, identification and removal of waste material, inspection of over-digs and under-digs are the major functions of roof and floor demarcation process, this practice helps to utilize the maximum resource of coal and minimize the probability of dilution.

In situ sampling helps in the upgradation of Resource model and provide an edge during the planning of daily blends of coal. As Bara Formation consist of different layers of coal which have different quality parameters, so it is necessary to make a blend of coal seams on daily basis to fulfil the requirement of Power plant. Blending plan is developed on the basis of Resource model, in situ sampling analysis, exposure and availability of coal seams.

Coal is extracted from mine by using excavators and transported to crushing plant via dump trucks, crushing plant sizes the coal to <350 mm nominal top size, sampling of crushed coal from stockyard is an integral part of coal crushing. Continuous time-based coal sampling is carried out by using ISO standards such as ISO: 13909-1 and ISO: 18283:2006.

Coal sampling is a continuous process integrated to Production, all the increments are collected in sample bags which covered by double polythene bags and transported to coal lab at the end of the day or production. One composite sample of whole day production is being prepared and sent to lab for Proximate/General analysis.

Prepared air-dried sample(s) sent for proximate/general analysis which include Total Moisture, Ash, Sulphur, Net Calorific value, Volatile Matter and Fixed Carbon. All the proximate/general analysis are carried out using ISO Standards and results are reported on "as received basis". Third party duly witness all the sampling and testing regime.

Core responsibilities of third party is to witness the whole coal sampling and testing protocols, verify equipment calibration, validity of reagents and generation of report or certificate. After issuance of certificate by third party, certified coal stockpile is ready to supply. On average SECMC supply 12,000 tons/day on-spec certified coal to power plant via dump trucks.

From page 1: Why Coal-Based Energy

is seeking to expand the share of coal power generation in total energy pie. The purpose is to save foreign exchange on oil-based electricity generation that stands at 35% and reduce reliance on the declining resource of natural gas-based electricity that comprises 42% of the energy source.

The government has developed policies and frameworks to enhance coal's share to 19% by 2030 and to 50% by 2050. The Energy Security Action Plan has set a target of generating 20,000 MW power from coal by 2030.

The major consumers of coal as the primary fossil fuel in Pakistan are railways, cement, fertilizer and power plants. There are 17 coalfields in Pakistan located in Punjab, Sindh and Balochistan.

While Balochistan produces the highest output of coal, Tharparkar has the largest coal reserves in Pakistan. Coal is extracted manually in Pakistan.

In Sindh, coalfields are present in Lakhra in Jamshoro district, Sonda-Jherreck, Indus-East and Jhimpir in Thatta district, Badin, and Thar. Currently only one power plant in the country uses coal as fuel, i.e. the 150 MW Lakhra Power Plant in Lower Sindh. The coal thermal plant can only generate 35 MW power using coal from Lakhra.

CPEC

China Pakistan Economic Corridor (CPEC) is a part of China's "One Belt One Road", seeking to promote Silk Route as a trade and financial initiative. Globally, it is seen as China's effort to position itself as world leader and expand its political and diplomatic role in the world order. Pakistan and China have been tied in strong strategic bond, characterising cooperation in military, defence, nuclear and economic sectors. Pakistan has drawn from China's support in times of sanctions imposed by the US. Chinese friendship is regarded as a diplomatic strength for Pakistan against the superpower US.

CPEC comprises loans, investment and grants amounting to US$60 billion covering a 2,700 km route from Gwadar port to Kashgar in China's Xinjiang region. Within Pakistan, CPEC covers transport infrastructure, industrial development, energy and Balochistan's strategically located Gwadar port. Agricultural modernisation and production form another critical component.

CPEC is a special project for Pakistan's political and security establishment. While it serves the political manifesto of employment generation, industrialisation, infrastructure development and addressing of a perpetual energy crisis, it also responds to Pakistan's military's need for strategic relationships with powerhouses outside the West, reducing its dependence on the latter.

CPEC's significance for Pakistan's military establishment can be gauged from the Former Army Chief General (Retd.) Raheel Sharif's repeated public assertions of strong position of the military in protecting CPEC and addressing any "aggressive designs" against the project, including a sabotage by India. Over 15,000 military personnel have been deployed, as part of the Special Security Division (SSD) and Maritime Security Force (MSF), for security of CPEC projects. In Balochistan, military engineers have been participating in construction of CPEC projects.

Security is a peculiar element of CPEC. The National Electric Power Regulatory Authority (NEPRA) requires power generation projects under CEPC to pay 1% of their capital cost as security cost as built-in consumers' end tariff.

It is due to its political and strategic weight that CPEC has been linked to national interest, national security and national defence narrative. This branding promotes security connotations and invite strict censorship by the Pakistani establishment around ideologies that it seeks to guard.

Report on Thar Coal Project and Local Community – Documenting Views and Experiences of Stakeholders by National Commission for Human Rights (NCHR)

From page 4: The Gorano Reservoir Issue

age, infiltration and evaporation of mine water and other environmental concerns. Some sites were of inadequate capacity;

- Only 1,400 acres, and not 2,700 acres, have been taken over for the reservoirs. Only three villages (Hajam, Shiv Jo Tar and Gorano) will be affected;
- Gorano and Dukkar Cho were selected as they provided adequate storage capacity and indicated lowest environmental impact;
- The subsoil water to be stored at the reservoir at Gorano and Dukkar Cho would be natural underground water which will be neither polluted nor hazardous;
- A detailed water analysis and heavy metal transport from the groundwater source to the disposal points at Gorano and Dukkar Cho has been submitted to DG SEPA;
- The study thus carried highlighted that the water did not contain most of the heavy metals, and the concentration of the few metals present is well below NEQs and NS-DWQs;
- The underground water will be saline. However, it will not be chemically altered or mixed with any pollutant;
- Once the power plant becomes operational, only a very small quantity of the extracted water will be pumped for storage. A major bulk will evaporate with no impact on the surrounding areas. Furthermore, after that, the reservoir at Dukkar Cho would be sufficient for storage of subsoil water and the reservoir at Gorano would be no longer needed;
- Cultivation quality of land will be affected in 20-25 years and not now;
- For the purpose of any project affected person (PAPs), there already exists a Resettlement Action Plan (released on) 23 April 2015, approved by the Government of Sindh;
- Pursuant to the Plan, a Resettlement Policy Framework for the entire Thar Coal block exists under which all PAPs are being compensated.
- The SECMC has deposited a total of Rs. 920 million with the Deputy Commissioner out of which Rs. 433 million have been disbursed by the Land Acquisition Officers to PAP.
- SECMC is providing due compensation to all PAPs as per law and applicable regulations which include payment to land owners, compensation for crop and other assets, provision of alternate source of livelihood such as jobs in Thar Coal mining and power projects and provision of healthcare and education facilities. Any affected person in Gorano will be compensated in like manner.
- The petitioners did not share their views in the public hearing held in April 2015;
- There is no graveyard or temple in 1.2kms of the reservoir site.

Waqas Abdul Aziz Ali Iqtidar

Environmental Indexing of Sustainable Lignite Deposits at Thar Coal Field

Lignite, generally yellow to dark brown or rarely black coal that formed from peat at shallow depths and temperatures lower than 100 °C (212 °F). It is the first product of coalification and is intermediate between peat .....

Environmental Indexing of Sustainable Lignite Deposits at Thar Coal Field

Pakistan's lignite coal deposit was discovered by Geological Survey of Pakistan in the 1990s and it spreads over more than 9,000 km2 area comprises around 175 billion tons enough to meet the country's fuel requirements for centuries.

Lignite, generally yellow to dark brown or rarely black coal that formed from peat at shallow depths and temperatures lower than 100 °C (212 °F). It is the first product of coalification and is intermediate between peat and subbituminous coal according to the standard coal classification used in the United States and Canada.

It has been estimated that nearly half of the world's total proven coal reserves are made up of lignite and subbituminous coal, but lignite has not been exploited to any great extent, because it is inferior to higher-rank coals (e.g., bituminous coal) in calorific value, ease of handling, and storage stability.

In areas where other fuels are scarce, the production of brown coal far exceeds that of bituminous coal. Most lignite's are geologically young, generally having formed during the Mesozoic and Cenozoic geological age (approx. 250 million years ago to the present).

Pakistan has emerged as one of the leading countries of the world after the discovery of huge lignite coal resources in Thar, Sindh. Pakistan has the seventh largest coal deposit in the world amongst the USA, Russia, Australia, Germany, China and Poland.

Pakistan's lignite coal deposit was discovered by Geological Survey of Pakistan in 1990s and it spreads over more than 9,000 km2 area comprises of around 175 billion tons enough to meet the country's fuel requirements for centuries. The economic lignite deposit of Pakistan is restricted to Paleocene and Eocene age (approx. 70 million years old) rock sequences.

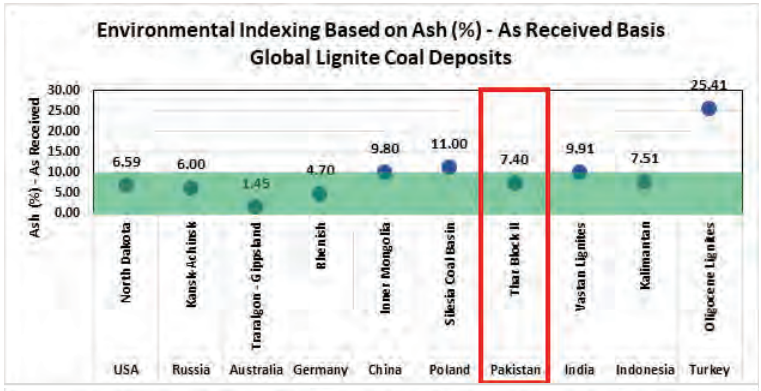
Lignite coal mining in Pakistan has always been considered as an environmental threat due to various myths which aren't based upon any technical rationale. One of the most common myth to halt utilization of Thar coal is that this coal has high sulfur and ash (combusted product of coal) contents.

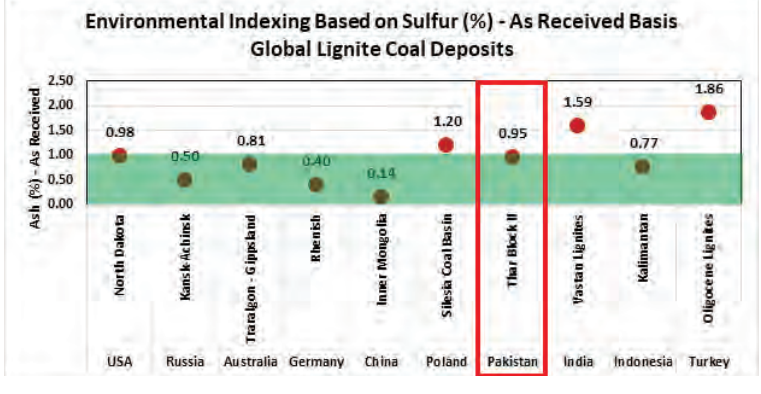
Sulfur in coal is fundamentally originates from either organic (pollen) or inorganic (pyrite) sources. Sulfur and Ash are the two most globally known potential environmental risk ingredients in coal-fired power plants.

However, as the power generation technology is getting advanced, sulfur and ash production from coal combustion can be effectively controlled and even reduced to the standard acceptable limits making it to an environmentally friendly component.

Thar coal in comparison with international lignite coal

In order to provide with a technical explanation against all the coal quality myths being considered for Thar coal deposit, Environmental Indexing based on the reported concentrations of sulfur and ash parameters have been done for Thar Coal in comparison with globally renowned lignite coal deposits.





Coming down to the facts, the sulfur and ash values for nearly topmost large scale globally recognized lignite coal deposits have been compared with Thar coal and are summarized below. Before proceeding any further, author wish to express that the data accumulation, compilation as well as QA/QC has been done by a competent Team of Resource Geologists with diverse experience and skills.

From the data collected and shown in graphs, it can be observed that the sulfur and ash concentrations of Thar coal deposit are very less i.e. 1.0% and 7.4% respectively and included among the good quality lignite coals of the world which are well known for their inherent environmentally friendly characteristics.

Further, Thar coal sulfur and ash values are also very identical to the lignite deposits of USA and Russia which are the top 02 lignite producing giants of the world. Moreover, Thar coal also proven to be much better than the lignite deposits of Poland, India, Indonesia and Turkey.

This shall now be concluded with the fact that Thar coal can be effectively utilized to its full capacity as it has very negligible proportion of sulfur and ash which can barely affect local or regional environment. In addition, Spontaneous Combustion and Acid Rock Drainage (ARD) are also treated as major environmental hazards regarding coal mining and power generation.

Both hazards are predominantly triggered by the concentrations of sulfur present in coal. Sindh Engro Coal Mining Company at its Lignite Coal Mine in Thar Coal Block II has placed all potential controls to eliminate these environmental hazards associated with coal mining.

Spontaneous combustion of coal is the process of self-heating resulting eventually in its ignition caused by the oxidation of coal (primarily sulfur bearing pyritic coal) when it is exposed to the atmosphere. It usually occurs at coal stockyards where coal is being storage for longer time periods.

Spontaneous combustion at Thar coal mine is being controlled by reducing the coal storage time at coal stockyard and by limiting the exposure of coal seams at mining pit to a minimum possible. Acid Rock Drainage (ARD) also known as Acid Mine Drainage (AMD) describes the formation of acid when sulfide bearing mine wastes (principally pyrite) are exposed to oxidizing conditions, typically in the presence of water, due to groundwater, rain and runoff.

Dumping area has the highest potential risk of acid rock drainage where acid prone material is being dumped and exposed to sunlight for oxidation which can result in acid generation and drainage to underground.

However, Storage areas like coal stockyard, ROM pad etc. has very least ARD risk since coal or pyrite bearing wastes are being stored at such areas for lesser time period thus eliminating the process of oxidization.

Likewise, Spontaneous Combustion, Acid Rock Drainage is also being effectively controlled during mining operations at Thar coal mine by dumping the Potential Acid Forming (PAF) rocks sequentially with Acid Neutralizing Material (Dune Sand) in the form of alternate layers and sealing both the materials completely with the non-permeable clay from bottom, top and sides to eliminate seepage.

Apart from this, another major environmental concern associated with the combustion of coal is the emission of toxic contaminants such as Sulfur Oxides (SOx) and Nitrogen Oxides (NOx) which affects human and environmental health.

Engro Powergen Thar Limited is running 2 * 330 MW coal fired power plant at Thar Coal Block II from indigenous Thar lignite coal has equipped with advanced technology based Circulating Fluidized Bed (CFB) boiler which is rated as an environmentally friendly boiler for power generation.

CFB doesn't require any backend equipment for sulfur and nitrogen emission controls. It uses limestone as a catalyst which controls the release of SOx and NOx during coal combustion to a minimum and within the specified NEQS/IFC guidelines.

Various national and international auditors have also acknowledged the fact that coal production and power generation at Thar Coal Block II is being done in accordance with standard HSE guidelines and has adapted the best practices for environmental compliance.

Thar Coal Project: A Brief Overview

The presence of coal in Tharparkar desert of Sindh was a common knowledge with the local population much before the actual test drilling for the coal was carried out in 1988. The Sindh Arid Zone Development Authority (SAZDA), in collaboration with the British Overseas Development Administration (ODA), had drilled wells for water near village Kharo Ghulam Shah. They found large-scale coal deposits underneath.

These findings prompted the Geological Survey of Pakistan (GSP) and the United States Geological Service (USGS), to carry out coal exploration in Thar Desert under the Coal Resources Evaluation and Appraisal Programme (Coal REAP) of the USAID between January 1992 and May 1994. This resulted in the establishment of a large-scale coal deposits across vast areas of Tharparkar district.

The second government of the former Prime Minister Benazir Bhutto, under the Energy Policy 1994, awarded a Hong Kong-based power company Hongpak United Power Generation to develop mines and install a coal-fired power plant of 1,320MW near Islamkot, Tharparkar. The company had committed a total investment of US Dollar 2 billion in the project.

However, after Benazir's removal from the PM office, her successor, former Prime Minister Nawaz Sharif scrapped all her energy projects including the one in Tharpakar district. Successive governments have made several attempts to attract foreign as well as local investment in Thar coal. They remained unsuccessful due to many reasons including unfavourable policies.

The data released by the Sindh Coal Authority suggests around 175 billion tons of coal reserves available in Tharparkar districts, spread over in an area of 9,100 square km in three talukas: Islamkot, Chhachro and Nagarparkar.

As suggested by experts, coal in the surveyed blocks is sufficient for the establishment of as many as six coal fired power plants of 1,000 MW each, with continuous production for 30-50 years duration.

The Tharparkar coal field is divided into 13 blocks. In the first phase, mining and power generation work started in Block II, in which 1.57-billion-ton coal is estimated to be available for power generation.

Technical details of Thar Coal

Thar coalfield is located at a distance of 395 km from Karachi. It covers an identified area of 9,100sqkm. Total reserves stand at 175 billion tons (highest in Pakistan) at a depth of 155-200 meter. Cumulative coal seam thickness is 24 meter. So far, 12 blocks have been planned after detailed drilling, covering an area of 1,192 sq km. Each block is estimated to carry reserves of over 2 billion tonnes.

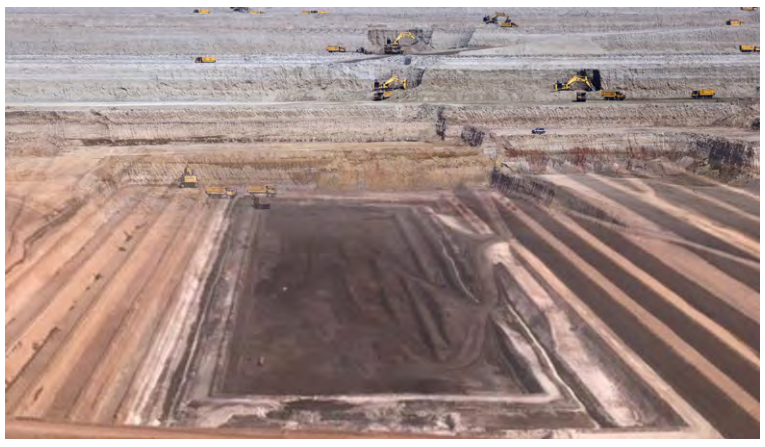
Thar's lignite coal has a moisture content of 46.8%, fixed carbon at 16.7%, volatile matter at 23.4%, ash at 6.2% and Sulphur at 0.9 to 1.2%. The calorific value btu/ib is 5,744. It is ranked at Lignite B to Lignite A.

Other lignite coal producing countries are: Germany (168 million tonnes), Greece (64 mt), Turkey (64 mt), Poland (60 mt) and Czech Republic (51 mt).

Coal mining methodology in Thar

Coal mining is carried out through two methods of operations: underground and surface mining. Most of the blocks in Thar Coal are opting for surface mining/opencast mining methodology for coal mining. Block II has opted for Bucket Wheel Excavators, Block I and VI are stated to be using for T&S and Block V will be using UGC (Underground Coal Gasification), which was taken up as an experiment.

Opencast mining is a surface mining technique that consists of three different methods: strip mining, open-pit mining, and mountain top blasting. These are briefly described below for readers' understanding:



- Strip mining involves removing the overburden (earth, sand, rock, and other material) in strips to enable excavation of the coal seams. This is done through using large machines, removing strips of overlying soil and rock and then excavating coal deposits;
- Open-pit mining which is another form of surface mining, involves blasting and mineral removing, "digging deeper into the earth causing a crater-like result";
- Mountaintop removal involves blasting of mountain tops through explosives in order to reach coal seams deep inside the earth.

All mining activity generates waste. For the ongoing Thar Coal project in Block II, the only block that is operational, the ESIA mentions waste management through dumping of mine overburden in the eastern corner of Block II.

Environmental impact of coal extraction

The environmental impact of surface/strip mining is the destruction of ecosystem through stripping away of trees, plants and topsoil. Surface mining is known to destroy mountain tops, landscapes, forests and wildlife habitats. It promotes soil erosion and barren land. The landscape changes can disrupt river channels, resulting in floods.

The underground coal gasification method is considered to be more environmental friendly, as it chemically transforms fossil fuel rather than burning it and also cuts down the need for coal transportation. However, it is extremely water intensive and is considered to emit twice as much carbon as a coal plant.32 According to news reports, villages in the vicinity of the UCG project in Block V, Thar had to shut down their water wells and RO Plants because these were emitting gases.

Report on Thar Coal Project and Local Community – Documenting Views and Experiences of Stakeholders by National Commission for Human Rights (NCHR)

The Gorano Reservoir Issue

Thar Coal's controversy started when the affected villagers of Gorano dam/reservoir started a hunger strike outside the Islamkot Press Club in October 2016 to protest against their displacement and environmental degradation of the region. The villagers complained that they were being forced to leave their abodes without any compensation or resettlement plan. Similarly, they raised their fear that the affluent generated from the coal mine would be harmful to their lives and the environment of the area.

The community filed a petition pertaining to the Effluent Disposal Scheme that is a part of the coal mining operations in Block II. The process and community's response is being presented in this section. The information has been drawn from the papers of the petition filed by the villagers and interview of the locals.

Effluent Disposal Scheme (EDS) for Block II Gorano and Dukkar Cho reservoirs are a part of the Rs 6.7bn Effluent Disposal Scheme sponsored by the Sindh Coal Authority with SECMC assigned to construct the reservoir. It was constructed (consulted out to) by the Balochistan Construction Company.

Gorano reservoir occupy 100km and Dukkar Cho cover 692 acres. They are located 25kms and 37 kms from Block II.

There are three aquifers in the Thar coalfield area. In order to extract coal from open pit mine, all three aquifers need to be simultaneously dewatered by installing 26 deep wells around the mine pit. The mining could not have started without a functional effluent system in place. The EDS entails 50 cusecs reservoirs and a 37km pipeline serving the mining dewatering operations. The subsoil water is to be transferred through the pipeline to the two selected reservoirs.

The EDS at Gorano and Dukkar Cho was not a part of the original plan for effluent disposal.

According to the project proponents - responding to a petition filed by the local community from Gorano and Dukkar Cho areas - a natural salt lake Trisingri Dhand, which was close to the Indian border was initially selected. However, it was dropped as an option as a 2014 ESIA pointed out that the site was a part of the Ramsar Treaty and connected to the Rann of Kutch wetlands close to the Indian border. The use of such site could have led to the violation of the Ramsar Convention on Wetlands.

Following this, a reservoir at Dukkar Cho was earmarked for construction. However, a study commissioned to NED University found the capacity of the selected reservoirs to be inadequate to hold the expected quantity of the effluent. Gorano was therefore selected at a later point.

Protest against construction of reservoirs

In late 2016, local villagers, mostly from Gorano and Dukkar Cho areas, initiated one of the longest mobilisation and protest campaigns against the arbitrary construction of the reservoirs. Starting from Islamkot Press Club in October 2016, the villagers marched to Karachi and continued protest well into late 2017. They stated that they were being forcefully evacuated from their land.

A petition was also filed in 2016 challenging the construction of the dam and demanding the Sindh High Court to suspend the process.

Key points of the petition are as follows:

- The petition stated that the petitioners own small agriculture lands, being cultivated on rain water. Fifty per cent of the agricultural land is a qabuli land. There are many temples and five old graveyards that hold sentimental value for the local community;
- The petitioners listed 15 villages with a population of 15,000 inhabitants who are going to be badly affected by the construction of the dam. They stated that land measuring 2,700 acres has been taken over to build the reservoir for storage of hazardous water;
- They stated that they have been illegally restrained from cultivating on their own land by the respondents. They also accused them of issuing threats to vacate the said land;
- The petition stated that no NOC was sought from the villagers before the start of the construction. The SECMC landed without any notice;
- The petition also argued that the construction of reservoir would have a serious impact on the land in the vicinity. The water to be stored is saline water and it will badly damage the cultivating land. The reservoir may also aggravate the drought situation in Thar;

Response of SECMC

SECMC in their response to the SHC refuted all the allegations of the petitioners, and raised that the petition has been filed with delay. The counter affidavit repeatedly emphasised that the Thar Coal project is of national interest and work on more than 18kms, out of 37kms has been completed.

Key points presented by SECMC included:

- The sites at Gorano and Dukkar Cho were selected after studying 14 sites for stor-

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