



INFORMATION MEMORANDUM

Blocks – IIIA & B, IV, VII, & VIII

Thar Coal Field

District Tharparkar @ Mithi, Province Sindh Pakistan



**Energy Department
Government of Sindh**

Table of Contents

Part I	<u>Introduction</u>	
	Pakistan – an Overview	1
	Coal- a new endeavor for Pakistan	4
	Comparison of Coal Quality of Pakistan	5
Part II	Government’s Commitment to investment	7-15
	Institutional Framework	7
	Set of Incentives	10
	Provision of Enabling Environment for Thar Coal Development	12
Part III	Detailed Description of Thar area	16-31
	Historical background	17
	General Geology of Thar	18
	Ground & water sources	21
	Surface water sources	22
	Environmental aspects	23
	Social aspects	24
	Status of existing blocks	29
Part IV	Technical details of the Blocks Offered	32-53
	Block-III A&B	32
	Block-IV	40
	Block-VII	43
	Block-VIII	47
Part V	The Proposal	54-62
	Expectation from Companies	54
	Who is Eligible to apply	57
	Evaluation Criteria	58

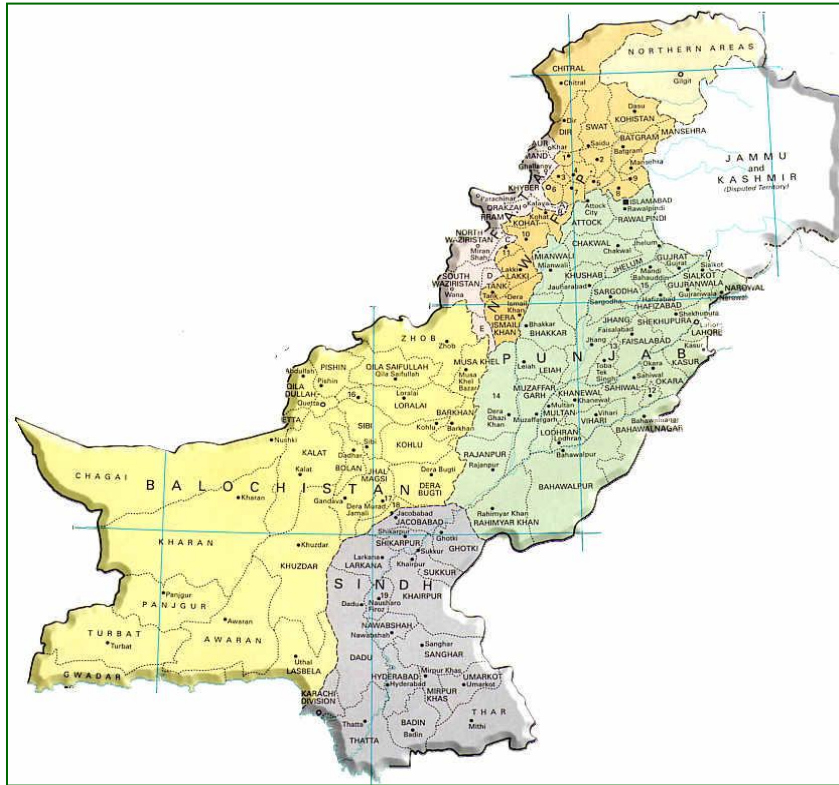
LIST OF ACRONYMS

EOI	Expression of Interest
GoP	Government of Pakistan
GoS	Government of Sindh
IRSA	Indus River System Authority
KESC	Karachi Electric Supply Company
MMDD	Mines and Minerals Development Department
MoF	Ministry of Finance
MoPNR	Ministry of Petroleum and Natural Resources
MoWP	Ministry of Water and Power
NEPRA	National Electric Power Regulatory Authority
PGS	Pakistan Geological Survey
PMU	Project Management Unit (Thar Coal-Energy – Karachi)
PPIB	Private Power Infrastructure Board
PSC	Project Steering Committee
PSU	Project Support Unit (Power – Islamabad)
OGRA	Oil and Gas Regulatory Authority
RFP	Request for Proposal
SCA	Sindh Coal Authority
SIDA	Sindh Irrigation and Drainage Authority
SPPRA	Sindh Public Procurement Regulatory Authority
TCAP	Thar Coal and Energy Project (TCAP)
TCEB	Thar Coal Energy Board
TOR	Terms of Reference
WAPDA	Water and Power Development Authority

INTRODUCTION

1. Pakistan: An Overview

Pakistan has an area encompassing 796,096 square kilometers and is bordered by India on the east, China on the northeast, Afghanistan on the northwest while Iran shares its border in the southwest with the Arabian Sea is in the south of the Country.



Pakistan is a multi-cultural society where many ethnic groups are represented and speak a variety of languages. Urdu is the national language of Pakistan; however, both Urdu and English are used in official matters and business transactions. Various dialects are spoken throughout the country and many of the educated population are tri-lingual, speaking the regional language, Urdu and English. Islam is the national religion, but there are other minority religions such as Christianity and Hinduism who make up over 3 percent of the total population.

Population

The population as of the 1998 census was 132.35 million, as compared to 85.09 million recorded in the 1981 census. The average growth rate over the past 10 years has been approximately 2% per annum. The population at the end of 2010 is estimated to be around 180 million. According to the last census, over 50% of the total population is less than 20 years old, while 52% are males and 48% are females.

2. State of Energy in Pakistan

The Pakistan's energy sector faces a number of critical challenges: (i) an energy and power resource deficit with power shortages reaching 25% of peak demand in summer FY13; (ii) 32.6% of households in Pakistan¹ lack access to electricity (19% in rural areas which represent 2/3's of Pakistan's population; (iii) a lack of long-term energy balance with declining gas supplies leading to greater dependency on imported oil; (iv) a financial deficit; (v) low generation efficiency - gas and oil fired thermal power generation plants are operating at significantly low efficiency and transmission and distribution losses are at a quarter of generated electricity; and (vi) rising energy costs, exacerbated by the high dependence on imported oil in Pakistan's energy mix, particularly in power generation, have adversely impacted the poor and the country's industrial competitiveness.

Pakistan's total energy consumption² in 2011-12 was 59.69 MTOEs consisting of 27.51MTOEs Natural Gas(46%), 19.82 MTOE Oil Products (33%), 6.81 MTOE Hydel (11%), 4.29 MTOE Coal (7%) and 1.26MTOE Nuclear Power (2%). Pakistan's energy demand over the next 15 years at a projected growth rate of 4.5% per annum is likely to reach a level of 147.78 Million TOEs by 2027-28. Domestic energy resources, which supplied 40.71 MTOEs in 2011-12 are expected to peak at 48.67 MTOE in 2012-13 which are expected to decline to a level of 39.90 MTOEs by 2027-28 primarily due to declining natural gas reserves. Pakistan therefore faces a large and growing energy deficit, which despite being bridged by planned nuclear, local coal, hydel projects, 110.38 MTOES will still be required to be met from imported Coal, LNG etc. options as local production is falling short of meeting the requirements.

Strategy.

In order to combat the challenges facing energy deficit in the country Government of Pakistan has announced National Power Policy 2013³ with a vision “ to develop the most efficient and consumer centric power generation, transmission, and distribution system that meets the needs of its population and boosts its economy in a sustainable and affordable manner” . To achieve the long-term vision of the power sector and overcome its challenges, the Government of Pakistan has set the goals and two of which are;

- i. Build a power generation capacity that can meet Pakistan's energy needs in a sustainable manner.*
- iii. Ensure the generation of inexpensive and affordable electricity for domestic, commercial, and industrial use by using indigenous resources such as coal (Thar coal) and hydel.*

The Government of Pakistan's (GOP) energy sector development strategy aims to enhance energy supply sustainably – for growth and expanded access - while reducing the dependence on imported oil. The broad contours of the affordable power strategy has been explained in National Power Policy 2013, and to meet the targets strategy focuses on

- Identify expensive RFO and HSD plants and convert them to gas or coal

¹ World Bank Data on Pakistan 2010, <http://data.worldbank.org/indicator/EG.ELC.ACCS.ZS>

² Pakistan Energy Outlook 2012-13 to 2027-28 Published by Pakistan Institute of Petroleum

³ Pakistan Power Policy 2013, www.mowp.gov.pk

- Shift tariff incentives towards low cost energy sources (hydel–run of the river, gas, coal, nuclear, biomass, etc.)
- ***Proliferate mining across the country and expedite coal projects at Thar blocks***

Other policy measures include (a) enabling a financial recovery, especially in the power sector; (b) implementing a social protection program to assist the poor in receiving a minimum amount of affordable energy; (c) streamlining GoP’s institutional set-up in the energy sector to increase decision-making efficiency; and (d) increasing private sector participation including through public-private partnerships (PPPs).

Future Scenarios. The Government estimates that energy demand will continue to grow during the next two decades, with Pakistan requiring an estimated additional 35,000 MW of power generation capacity by 2020. Based on the analysis, the expected new power generation build-out will be about 7,700 MW⁴ of additional capacity by 2020, leaving a gap of over 27,000 MW. The GoP expects a significant demand-supply gap to remain in the short-medium term, even after the concerted demand-side management, and the expanded deployment of lower-carbon energy resources such as indigenous hydropower, natural gas, and renewable. Likely scenarios of energy sector development are as follows:

- The Government is pursuing policy to replace Oil with ***Indigenous Coal*** in power generation. This would provide fuel security, foreign exchange savings, adequate power and greater viability for Coal Projects on local coal. The dried lignite from Thar, after briquetting, can be transported and utilized by retrofitted Thermal Power Plants in the country. It is estimated that USD 7-8 bn could be saved annually if the existing Thermal power plants were converted from Furnace Oil to Coal. There is a capacity of 2967 MW in GENCOs and 2150 MW in Independent Power Plants (IPPs) which can be converted to Coal (Total 5117 MW) with a cost of USD 1.5-2.0 bn. Initially these power plants can use imported coal. However, the conversion be designed having compatibility with Thar coal. It will provide added incentive to investors in Thar coal mining.
- The highest priority is being given to improving the efficiency of the electricity supply; and also to implement conservation measures. Installed generation capacity was 23,578 MW in June, 2008⁵, and current transmission and distribution losses (technical and non-technical) are estimated at about 25% of total generated power.
- Pakistan’s hydroelectric potential is estimated at 40,000MW, out of which the economic hydroelectric potential is around 20,000MW. However, production is seasonal (Pakistan’s current installed hydropower capacity of 6,400MW falls to less than 2,000MW during the 4-5 months of winter when water flows are minimal) and best suited to meeting peak-time demand, with base demand best met by thermal power sources (and in some cases by large storage hydro). Indicated hydropower installed capacity could rise by 10,000MW by 2030⁶.

⁴ Assumes 7,000 of a total 10,000 MW of new hydro potential, no net increases in gas or oil, and 700 MW of a total of 9,700 MW for wind.

⁵ State of Industry Report 2012, www.NEPA.org.pk

⁶ The government projections for 2030 are from the Medium-Term Development Framework 2005-10

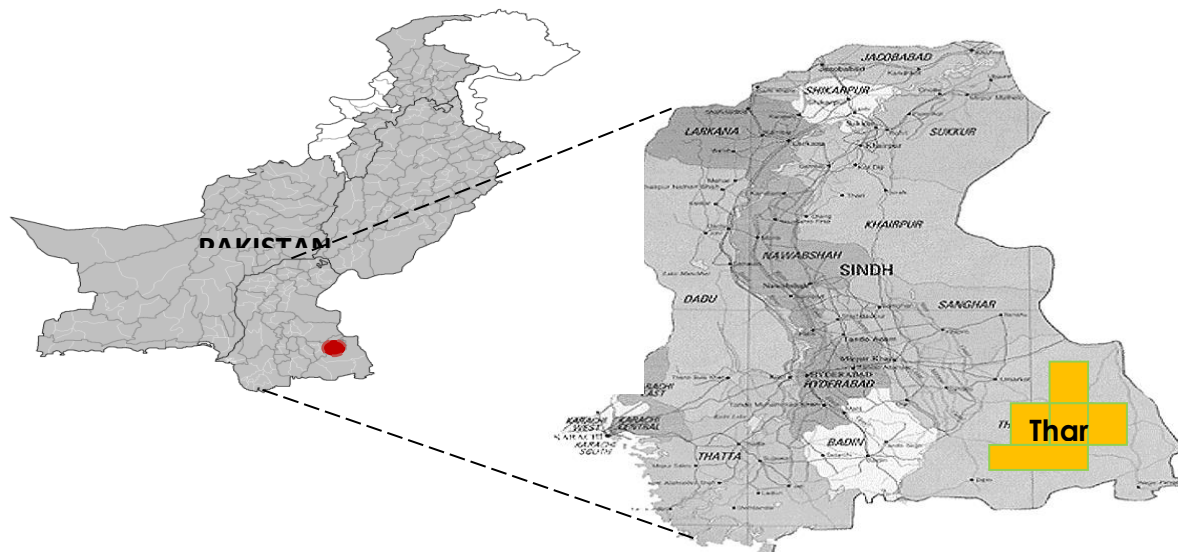
However, given the long lead times and high costs the GoP will seek to complement new hydropower projects with other energy sources, particularly to meet base load needs.

- The supply of natural gas for power generation is declining, and there is little or no natural gas supplied for power generation during the 3-month winter period. Proven reserves have increased modestly from 26TCF in 2000 to 30TCF in 2007. Production has remained flat over the past 3 years, while demand in non-power sectors has grown. New gas discoveries are expected to only partially compensate for depleting supply.
- Pakistan's wind potential is estimated at 9,700MW; however, like hydro power it is less reliable for base load needs and more suitable for peak loads. The wind power will complement an expanded base-load electricity system but is not an acceptable substitute for base-load itself.

Coal – A New Endeavor for Pakistan

Government of Pakistan has recently taken many initiatives on Coal based Power Generation. Pakistan Power Park at Gaddani is planned for 5200 MW Power Generation based on imported Coal having Coal Demand up to 13.31 Million tons per annum, similarly, Conversion of Three IPPS will require Coal up to 11.48 million tons per annum, and five GENCOs will require Coal 16.9 Million Tons per annum. Hence, Pakistan has cumulative demand of approx. 28.38 Million Tons per annum in case all the existing IPPS, GENCOS and recent plans get mobilized within five years' time. Keeping in view the current plans and Government of Pakistan aggressive strategy to cater energy security challenges Coal Market in Pakistan is having clear potential. Thar Coal Mining will be pivotal in this scenario and will be major feedstock for future Coal based Power generation in Pakistan.

Within Pakistan's energy portfolio, natural gas and oil dominate (at least 1/3 of power is based on imported oil). Pakistan's coal resource potential is estimated to be around 185 billion tons, with present production of only 5 million metric tons per year, mostly for local industrial use. About 175 billion tons are located in Sindh province at *Thar*—one of the largest single coal deposits in the world, yet to be exploited. The coal quality is '*lignite*' a fossil fuel with a heating value 5,700-7,300 Btu/lb. Thus, the development of indigenous coal resources for large-scale base load power generation would be new to Pakistan.



Since the discovery of the Thar Coalfield, the government has shown strong interest in developing the lignite resources for power-generation. The government has made a decision to allow for a flexible approach towards the size and bundling of the projects, has planned improvements to infrastructure, and allocated funding to commence technical studies in the Thar area, including hydro-geological assessment. Issues such as coal pricing, resource rents, tariffs for power, and uptake arrangements are being addressed. Thar Coal & Energy Board (TCEB) has been declared as coal pricing agency and TCEB has developed a Coal Pricing model through international consultants.

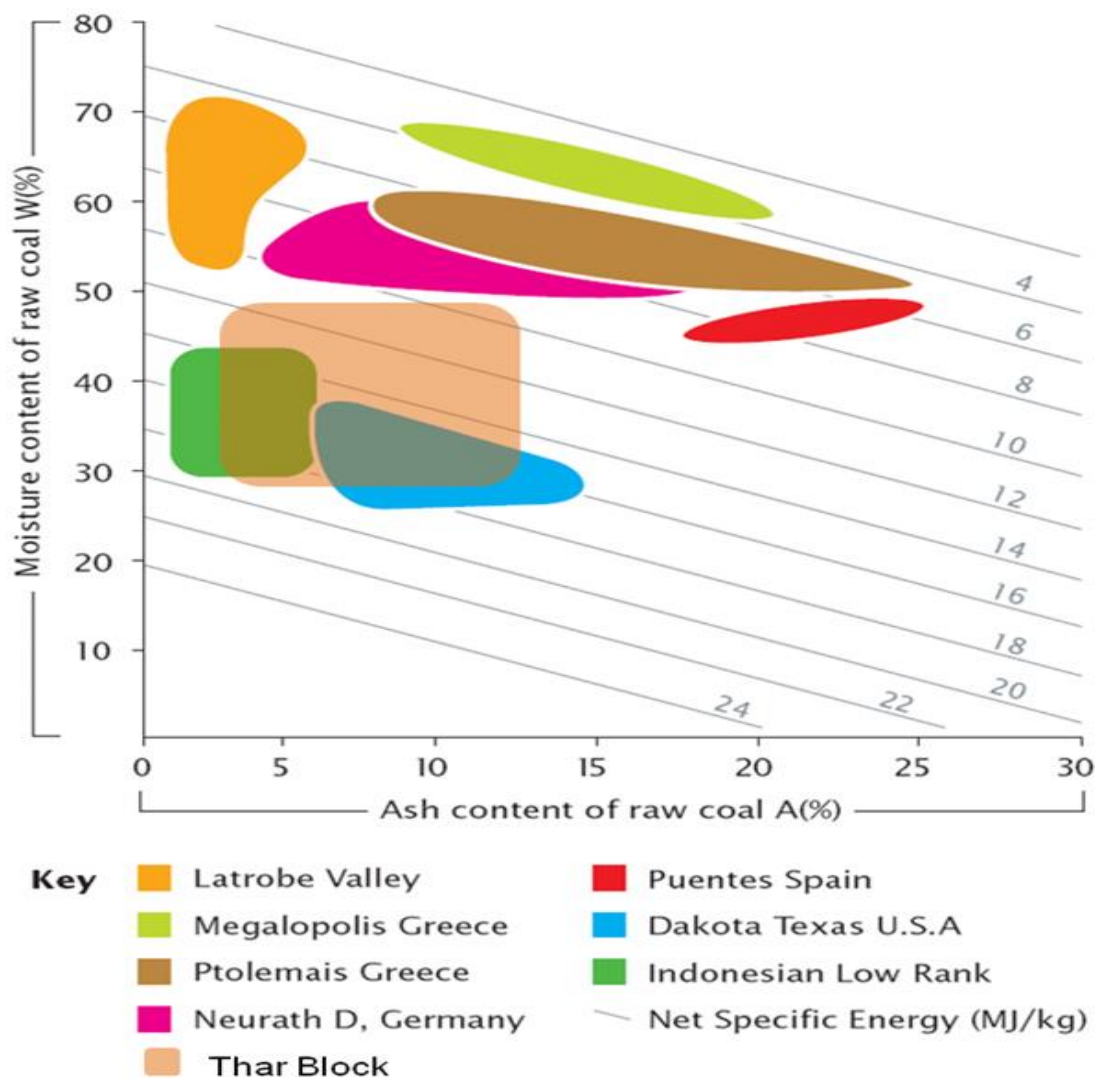
The government has declared Thar Coal as projects of strategic importance and considers development of Thar coal as a matter of national security. As the national energy crisis becomes critical, the ***Government of Pakistan considers development of coal to power sector and indigenous coal is a must for Pakistan.*** The Government considers the development of indigenous thermal coal as a ***least cost fuel*** source for power generation and all coal for industry application is essential.

Comparison of Coal Quality at Thar

Thar lignite having a stripping ratio of 6:1 and heating value of 6200 ~ 11000 Btu/lb. is similar or somewhat better than many lignite resources where successful mining and power generation is being done. For example:

- *India's Neyveli lignite has a heating value of 5,200 Btu/lb and stripping ratio of 7:1 coals. Total generation based on Neyveli lignite is more than 2,700 MWs.*
- *Hungary's lignite has stripping ratio of 9:1 and heating value of 3035 Btu/Lb and power generation above 1800 MWs.*
- *Germany's Rhineland lignite having stripping ratio of 4.9:1 and heating value of 4514 ~ 11054 Btu/lb is fueling power generation of more than 10,200 MW.*

Comparison of Thar with Other International Mines		
Deposit	Stripping Ratio (m ³ : t)	Heating Value (MJ/kg)
Thar	6.6 : 1	11.6
Kosovo	1 : 1	7.8
Rhenish Area, Germany	4.9 : 1	8.9
Hambach, Germany	6.3 : 1	10.5
Hungary	9 : 1	7.1
Greece	10:1	5.02



Part-II

GOVERNMENT COMMITMENT TO ATTRACT PRIVATE INVESTMENT IN THAR

The Government of Sindh seeks to develop the Thar coal reserves in a strategic and systematic manner that will ensure the country's national security and long-term use of indigenous coal for electricity generation and industry use. The development of Coal resources in Sindh is planned in such a manner that

- Seeks to develop several large-scale coal mining operations and supports and encourages domestic and foreign investment in the coal sector.
- Supports competitive process for allocation of coal resources blocks to investment firms for exploitation of the resource in scientific manner.
- Supports the market-based evaluation of proposals, equitable distribution of revenues and transparent issuance of licenses, leases and project awards. Government further supports the transparent operation of Pakistan's coal sector and surety of tenure (enforceable contract terms) for all legitimate investors.
- Development with Care is ensured for future generations- For the development of the coal reserves, Government seeks to protect its environment and its people.

Government seeks to accelerate the development of its coal resources with specific emphasis on power generation. In this regard, considerable emphasis will be given to the Thar Coal Fields, host to at least 95% of the country's coal reserves.

Government is promoting the coordinated development of the coal industry and related industries. The construction of large-scale coal mining should be linked with conditions for water resources, transport and power to enhance local industrial and economic development. In support of large-scale coal mining at Sindh, the Thar Coal Energy Board (TCEB) serves as a coordinating body for Federal, Provincial and District institutions and it promotes information exchange among key stakeholders.

Government Commitment

Government of Sindh & Pakistan is committed towards provision of an enabling environment that can ensure availability of safety-valves against investment risks, provision of tenure security and evolving an 'integrated link' of mining with power generation. To achieve this Government of Sindh & Pakistan focuses on strengthening institutional structure, developing physical infrastructure & implementing investor friendly policy & regulatory mechanism.

Government will ensure that social safeguards are in place for communities and citizens impacted by coal and related development. Government has established a predictable and enforceable legal and regulatory framework to support sector operations.

INSTITUTIONAL FRAMEWORK SUPPORTING DEVELOPMENT OF THAR COAL

Institutional arrangements that support power operations are federally administered while institutional arrangements that support Coal operations are provincially administered. Since, large-scale coal mining or related coal-fired power generation is new to this country, the Government of Pakistan and Government of Sindh has taken important measures to promote

federal-provincial government synergies. These institutional relations have been especially defined in the past five years in a targeted manner to ensure institutional clarity and an investor-friendly environment for Thar coal activities.

Institutions

The regulatory and institutional frameworks for the mining and energy sector in Pakistan are clearly defined. The current legal framework of the mining sector in Pakistan consists of three generation of documents, conceived under different circumstances. Solid minerals (including coal and coal bed methane) are a provincial subject in Pakistan, while hydrocarbons (mineral oil and gas) within the province or the territorial waters adjacent thereto shall vest jointly and equally in that province & the federal government⁷. The authority responsible for the development of the mining sector is the provincial government, while the large-scale production and distribution of electricity is principally the responsibility of the Federal Government.

Provincial Institutions. Each province has its own Department of Energy Department/ Mines & Mineral Development Departments with the mandate to grant mining licenses and leases, collect fees and royalties and monitor activities in the mineral sector. ***In Sindh, the Energy Department has full regulatory authority for coal.*** The project implementation, in particular infrastructure development projects in coal areas, is through the Sindh Coal Authority (SCA) working under Energy Department.

Sindh Coal Authority. Established under Sindh Coal Authority Act, 1993 passed by Provincial Assembly of Sindh. Became operational in 1994. Under Section-6 of SCA Act, the general direction and administration of the Authority shall vest in the Board constituted under Section-7 of the Act. SCA Board is comprised of members. Minister of Energy is Chairman of the Board with Additional Chief Secretary (Development), Secretary Finance, Secretary Energy, Two MNAs and Two MPAs and two non-Official Members are on the SCA Board with DG SCA as member and Secretary of the board. ***The Sindh Coal Authority is exclusively responsible for exploration, development, exploitation, mining, processing and utilization of indigenous coal resources*** with the following functions specifically: -

- accelerate the pace of activities relating to coal development and shall be specifically responsible for planning, promoting, organizing, under-taking appropriate projects in this behalf and implementing programs for exploration, development, exploitation, mining, processing and utilization of coal;
- prepare and execute schemes under this Act and take such steps as may be necessary in connection with the execution of such schemes;
- advise Government in all matters connected with conservation, development, working and utilization of geology to evaluate coal deposits;
- publish results of research and development activities of coal resources of the Province, from time to time, for general information;
- promote joint ventures specially with foreign investors for development of coal resources of the Province;
- Take such steps as may be necessary or conducive to the attainment of the objects.

⁷ Article 172 (c) Constitution of Pakistan amended in 18th Constitutional amendment bill 2010 the ownership of mineral oil and gas is under joint ownership of federal Government & the province.

- **EXPLANATION:-** Planning includes studies, surveys, experiments and scientific and technical evaluation, whereas promotion, organizing and implementing programs include setting up of infrastructure, overall environment including service facilities such as roads, water, electricity, gas skilled and unskilled labor, professional personnel, land development and financial facilities and ancillary facilities directly required to implement the coal development schemes and plans.

Thar Coal and Energy Board (TCEB). The coordination and cooperation between federal and provincial governments is a key to the success of the Thar Coal-to-Power Development. In recognition of both the need for coordination and the potential future importance of Thar based coal-to-power development, the TCEB was created in July 2008 the GoP and the GoS to act as a one-stop organization on behalf of the Islamic Republic of Pakistan and the Province of Sindh, with respect to all matter relating to, inter alia, facilitation for the Thar coal mineral resource and power generation using this coal. The Provincial Assembly of Sindh has also approved the Thar Coal & Energy Board Act, 2011 in June, 2011.

Thar Coal Energy Board (TCEB). TCEB is established as a one-stop organization where federal and provincial governments meet to facilitate investments in Thar. TCEB is the lead institution to coordinate the overall development of the Thar Coal Basin and coordinates Federal, Provincial and District stakeholders. TCEB facilitates infrastructure development at Thar, serve as the Coal Pricing Agency for Thar coal, and assesses and approves applications for projects at Thar. The rationale for the establishment of the Thar Coal Energy Board (TCEB) was to institutionalize the Government of Pakistan and the Government of Sindh's commitment to the unprecedented development of the Thar Coal Basin. TCEB members represent Federal and Sindh Government interests as well as the private sector. The creation of TCEB ensures that a legally empowered body is in place and is dedicated to the mobilization and monitoring of the development of the Thar Coal Basin.

Federal Institutions. The Private Power Infrastructure Board (PPIB) is authorized to promote and facilitate private sector participation in the Pakistan Power Sector. Additionally a number of ministries, departments and agencies are involved in the day to day management and oversight of the energy sector. These are federal agencies including the Ministry of Water and Power (MoWP) which functions as the owner of all public sector assets and utilities, and formulates sector policy and strategy – in consultation with other ministries, notably the Planning Commission, and Ministry of Finance; and the Ministry of Petroleum and Natural Resources (MPNR) fulfills similar functions in the hydrocarbon (oil and natural gas) sector.

Investment Protection

The foreign Investment in Pakistan is fully protected under foreign Investment protection law of 1976, passed by the parliament, under which the guarantee full safeguard to investment in Pakistan.

Set of Incentives, Concessions and Protections for Development of Indigenous Resources

On the recommendations of Thar Coal & Energy Board the Economic Coordination Committee of Federal Government (legal constitutional forum headed by Federal Finance Minister) has approved a set of incentives, concessions and protections for development of indigenous Coal resources of Sindh. The following set of incentives, concessions and protections are available to facilitate investors for development of indigenous Coal resources of Sindh:-

Special Economic Zone

- Thar Coalfield is declared as *Special Economic Zone*, and the projects of development of Thar (also including coal mining and power generation) declared as 'Projects of National Security'

Rate of Return

- 20% (*\$ Based*) IRR to firms which achieve Financial Close before 31st December 2015 for Mine & Power Plants based on indigenous coal and additional half a percentage IRR i.e. 20.5% IRR for firms which Financial Close by or before 31st December 2014.

Exemptions/concessions

- Zero percent *customs duties* on import of coal mining equipment and machinery including vehicles for site use. (SRO 222/2013 15th March 2013)
- *Exemption* on withholding tax to shareholders on dividend for initial 30 years.(SRO 317(1)2011 dated 19th April 2011)
- Exemption on withholding tax on procurement of goods and services during project construction and operations. (Clause 78, Part IV of 2nd Schedule of ITO)
- Exemption for 30 years on other levies including special excise duty, federal excise duty, WPPF and WWF. (FED withdrawn vide SRO 489(1)2011, SED withdrawn vide SRO NO 655(1)2010)

Protections

- **Currency Exchange Rate Protection:**
 - (i) To enable maximum competition from Suppliers and Contractors, the Mining & Independent Power Producers (MIPPs) are protected from the impact of exchange rate variation between US dollars, Euros, Pounds Sterling and Japanese Yen up to Commercial Operation Date (COD).

- (ii) At the COD, the capital cost be fixed in US dollars based on actual currencies of EPC Contract is acceptable to concerned agencies at the time of tariff determination, sources of financing, payments and actual exchange rates against rupee for the four currencies (US dollars, Euro, Pound Sterling and Japanese Yen) on the relevant dates.
- (iii) To broaden the access for debt financing, debt can be obtained by MIPP in US Dollar, Pound Sterling, Euro and Yen. This will receive the same treatment as currently available for US dollar denominated debt.
- (iv) As O&M costs are incurred subsequent to COD, O&M Cost Adjustment will continue to be based on exchange rate variations between Pak Rupee and US dollars.
- (v) The Performance Guarantees to Government of Pakistan and Letter of Credits will be accepted in Euro, Pound Sterling and Yen in addition to US\$.

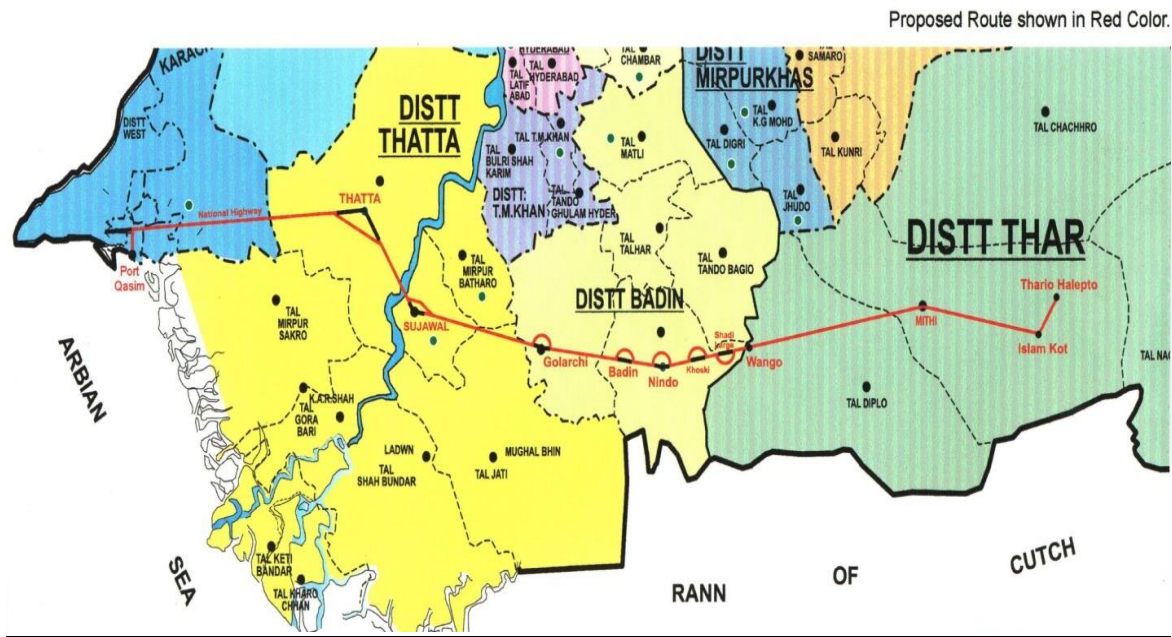
- **Additional Incentives:**

In addition to the aforesaid incentives, Coal Based Power Projects and Coal Mining Projects in Sindh shall have the same incentives, concessions, protections and security package as that available to IPPs developed pursuant to Power Generation Policy 2002 (as amended from time to time).

Provision of enabling environment for Thar Coal Development

The Government of Sindh attaches highest priority to Thar Coal Development and for this provision of enabling environment on fast track basis to attract FDI has been initiated. The enabling environment includes building physical and institutional infrastructure. The capable and conducive institutional infrastructure includes a capable and empowered governing body with stand-alone status, that can ensure devising and implementing 'special package' on tariff, pricing and other concessions necessary for attracting the investors. The enabling environment also includes developing physical infrastructure that can contribute to the mining and power generation. This has to be initiated from the scratch. The provision of water required for mining and power generation, disposal of waste, road and railway network for transportation of equipment and other material land use plan and resettlement plan all require specific allocations. This all work is required in the initial phase. Once it is in place, the large scale coal to power generation would be cost effective and sustainable. Besides, it would also provide confidence to investors, investing in long term projects by minimizing risk margin and increasing comparative margin. In order to implement the vision of producing 10,000 MW from Thar coal by 2020, Sindh Energy Department is actively pursuing the goal. Following development initiatives reflects the resolve of the GOS towards Thar Coal Development. Financial Allocation for all the scheme for this financial year is 11.686 Billion PKR. In total Government is investing more than 30 billion PKR for provision of enabling environment.

ROUTE PLAN FOR TRANSPORTATION OF MACHINERY FROM PORT QASIM TO COAL FIELD (THARIO HALEPOTO)



ONGOING AND NEW SCHEMES INCLUDED IN ADP 2013-14				
Sr/ADP Gen. No.	Name of Sector / Scheme	Cost	Expenditure up to June 2013	Allocation 2013-14
1	2	4	5	8
	ONGOING SCHEMES			
1/90	Planning, Designing & Construction of Islamkot Airstrip	972.070	795.498	244.000
2/91	Environmental & Social studies, Land Use Plan including Resettlement Framework and development of Geographic Information System (GIS) for Thar coalfield.	230.000	66.181	126.344
3/92	Preparation of Water Master Plan for Thar Coalfields including Hydrogeological, Water Supply and Waste Water Management Studies	400.000	1.217	138.000
4/93	Establishment of Training Institute in the field of mechanizing mining / coal based power generation in collaboration with renowned foreign institution	600.000	0.000	1.000
5/94	Installation of 31 R.O. Plants in Tharparkar and Umerkot Districts.	1139.972	988.001	25.000
6/95	Installation of Reverse Osmosis (Desalination) Plants at 25 villages of Tharparkar (President's Directive).	942.00	610.640	100.028
7/96	Marketing of Coal Resources of Sindh through Road Shows, Conferences, Seminars and Training to Attract Potential Investors and International Financing Institutes.	75.000	5.805	5.000
8/97	Construction of 50 Cusecs Drainage and Waste Water and Effluent Channel from Mining of Thar Coalfield Unit No.2.	3672.772	15.663	3172.772
9/98	Improvement & Widening Road Network from Seaport Karachi to Thar Coalfield Area via Thatta, Badin, Wango, Mithi, Islamkot (Phase-I Upto Wango More 124.5 Mile= 200 KM)	3034.028	426.998	2000.000
10/99	Widening/Improvement of Road from Wango More to Thar Coalfield Area (Phase-II) (Mile 0/0-83/2 (134.86 km)	3401.240	469.933	2900.000
11/100	Water Carrier From Nabisar to Islamkot for Thar Coalfield.	4078.270	12.89	1000.000
12/101	Construction of Water Carrier from LBOD Spinal Drain RD-362 to Nabisar for Thar Coal Power Generation Units.	4999.685	500.00	1000.000
	NEW SCHEMES			
13/102	Upgradation and Enhancement of Reverse Osmosis (Water Desalination) Plants at Mithi City and Islamkot Town, District Tharparkar.	934.820	50.00	784.820
14/103	Additional and External Development of Thar Lodge at Islamkot.	80.680	0.00	66.036
15/104	Installation of Six Reverse Osmosis (Water Desalination) Plants at Six Villages of Tharparkar (Chief Minister's Directive)	314.596	0.00	100.000
16/105	Repair and Renovation of Residential Colony and Office Buildings of Camp Office, Sindh Coal Authority at Mithi.	300.000	0.00	22.000
17/106	Construction of Road from Islamkot upto Singhario Road near Thar Coal Block-V (6 kilometers)	175.000		1.000
		25350.133	3942.827	11686.000

Water Master Plan for Thar Coal Fields including Hydro geological, Water Supply and Wastewater Management Studies

Thar Coal Fields are located in Thar Desert area occupying East and South-Eastern portion of Sindh Province of Pakistan. Being a desert, the area is extremely dry arid region with very low scanty rain fall and limited water resources. The supply of water for the development of coal mines, power plant and related domestic complex is vital for successful future operation of the facilities. The GoS has embarked upon a detailed study for preparing Water Master Plan for Thar Coal fields. This includes studies of Hydro-geological, Water Supply and Waste Water Management.

The main objective of the consulting services is to support Sindh Energy Department, Sindh Coal Authority (SCA), Government of Sindh, and Government of Pakistan (GOP) in: (i) hydrological studies of the Thar coal mine area, and assessment of water demand during various phases of development of mines and power plants in future, including the use of lignite drying plants; (ii) assessment of best source/option for meeting water demand in short, medium and long term given the available surface and groundwater resources and their location (iii) hydro-geological investigation of the area and assessment of groundwater resources and quality of groundwater and required monitoring of observation network for two years; (iv) estimate of drainage effluent and wastewater that is likely to be generated from the mines and the industrial complex, taking cognizance of the 25 mil m³ (this is only the value for one mine) per year mine effluent in the feasibility study and the proposed options for treatment to use it for human consumption or alternatively options for proper disposal of this effluent; and (v) feasibility level designs for least cost option for water supply and wastewater disposal system. The consultancy work on this scheme will be started in 2014 and duration of the project is 2 years.

Environment and Social Studies including Land Use Plan and Resettlement Frameworks for Thar Coal Fields.

The development of Thar coalfields and associated establishment of coal-to-power projects are among the major objectives of the Government of Sindh. The Government has planned to have Environmental and Social studies including Resettlement Frameworks and Land use Plan in place, and develop a Geographic Information System (GIS) for Thar Coal Fields to facilitate future Mining and Power Plants. This would facilitate all stakeholders including investors by providing vital geographical information and also set basis against which changes in the environment and socio-economic situation in the area can be assessed once mining and power generation and associated activities begin. This study entitles as '*Environmental and Social Studies including Resettlement Frameworks, Land Use Plan for Thar Coal Fields*' comprises two components; I) Environment and Social studies and II) Land Use Plan.

The study was commissioned in 2012 and M/s Mott MacDonald Pakistan is currently working on the study. The Study is expected to be completed by June 2014.

GIS for Thar Coal

The GoS is developing GIS for Thar Coalfields for tenement management and investors facilitation. The work in this regard is going on which include developing land use plan, resettlement plan and related social & environmental registries.

The GIS Consultant has developed high (0.6-0.5) and low resolution sheets (15-30 meters) which combine hydrological, topographical, social, and environmental and infrastructure data (including existing roads, power grids etc). The high resolution images covered existing blocks using high / low resolution Digital Elevation Model (DEM), technical specifications are DEM Positional Accuracies: (For High Resolution) CE90 4-5 meters LE90 2-3 meters NMAS 1:5000 Ortho-corrected Yes, Target Elevation Angle >72 deg Mosaic Yes – High positional accuracy (For Low Resolution) SPOT DEM (30 m or less horizontal accuracies & < 20m vertical) Projection: UTM Zone 42 / Survey Sheets in LCC Local cartographic Grid, while the entire area of 9100 square kilometer can be covered through low resolution images. The data is being collected and updated as a continuous process incorporating findings of studies undertaken at different stages of project

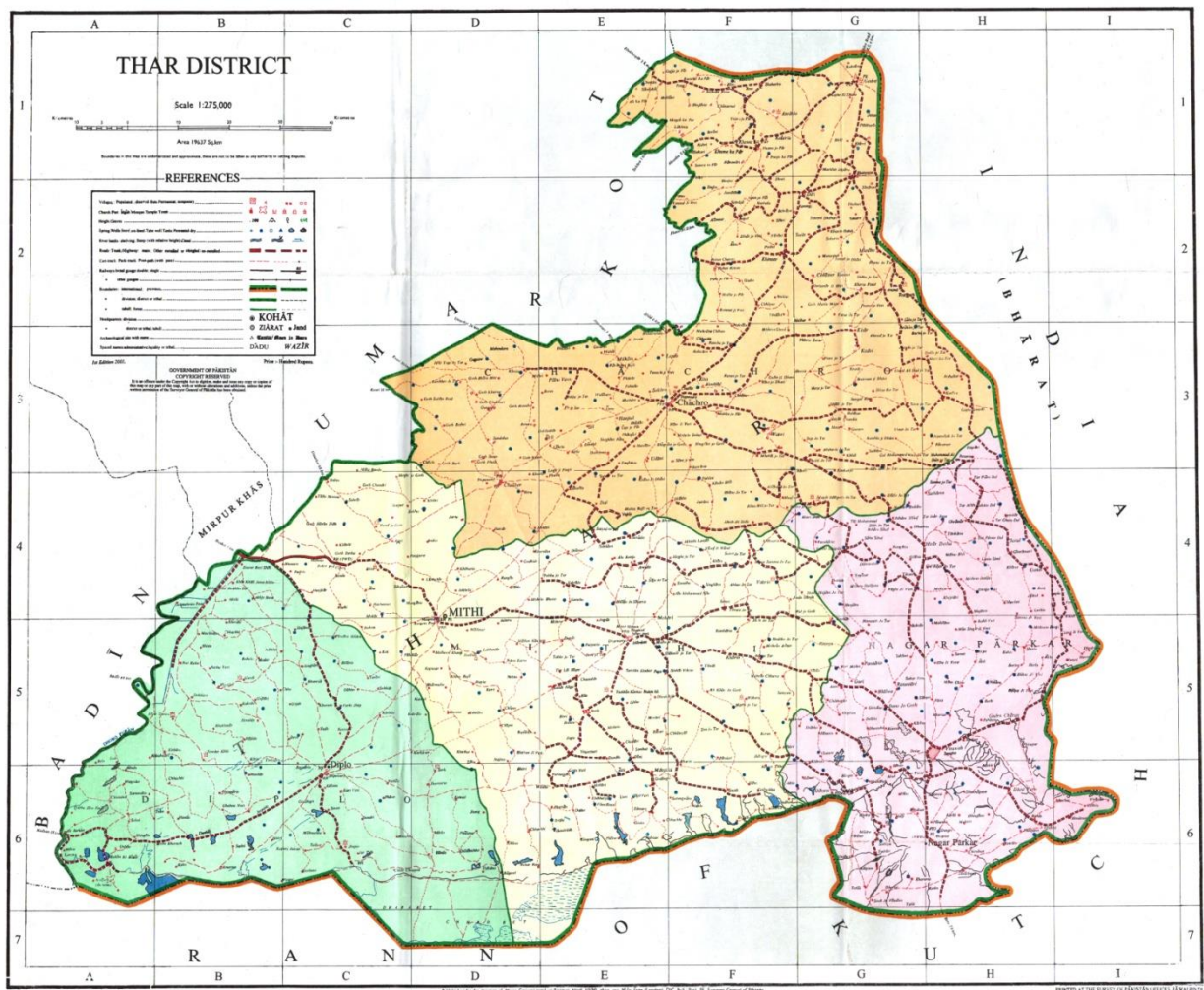
Web-Portal

The Consultant has designed a Thar Coal Web-Portal to comprise a fully digital system incorporating appropriate software for tenement management or GIS. The System designed so as to facilitate its immediate or eventual linking to the Energy Department website for internet publishing of information on the status of tenements and applications. This includes provision of on-line access to a regularly updated tenement map of Thar Coal so that investors are able to see which areas are available for application.

Part –III

Detailed Description of Thar Area

Thar Coal fields are located in Thar Desert area occupying East and Southeastern portion of Sindh Province of Pakistan. Being a desert, the area is extremely dry arid region with very low rainfall and limited water resources. The supply of water for the development of mine, power plant and related domestic complex is vital for successful future operation of facilities. The estimated coal reserves of the Sindh Province is nearly 185 billion tones in mine fields like Thar, Badin, and Thatta-Sonda-Jherrack of which Thar mines possesses one of the biggest Lignite deposits spread over 9100 sq. km in the Tharparkar district.



The investigation drilling in the past revealed that the coal is in-seams with extractable thickness of 22 m at a depth of 110 m up to 200 m. The upper seam layer of coal reserve reportedly contains in-situ water.

Role of Thar Coal. To address the persistent energy gap, the large indigenous coal (lignite) resources at Thar in Sindh Province form an integral part of Pakistan's long-term energy security strategy. The Thar resource has a very good potential – depending on the scale of the mining operations - to be an economic option compared to other energy-sources. Development of Thar is expected to emerge through a partnership of government and the private sector, wherein the private sector would assume investment risk subject to viable commercial market conditions and the government would provide the governance and stability necessary to facilitate such investments.

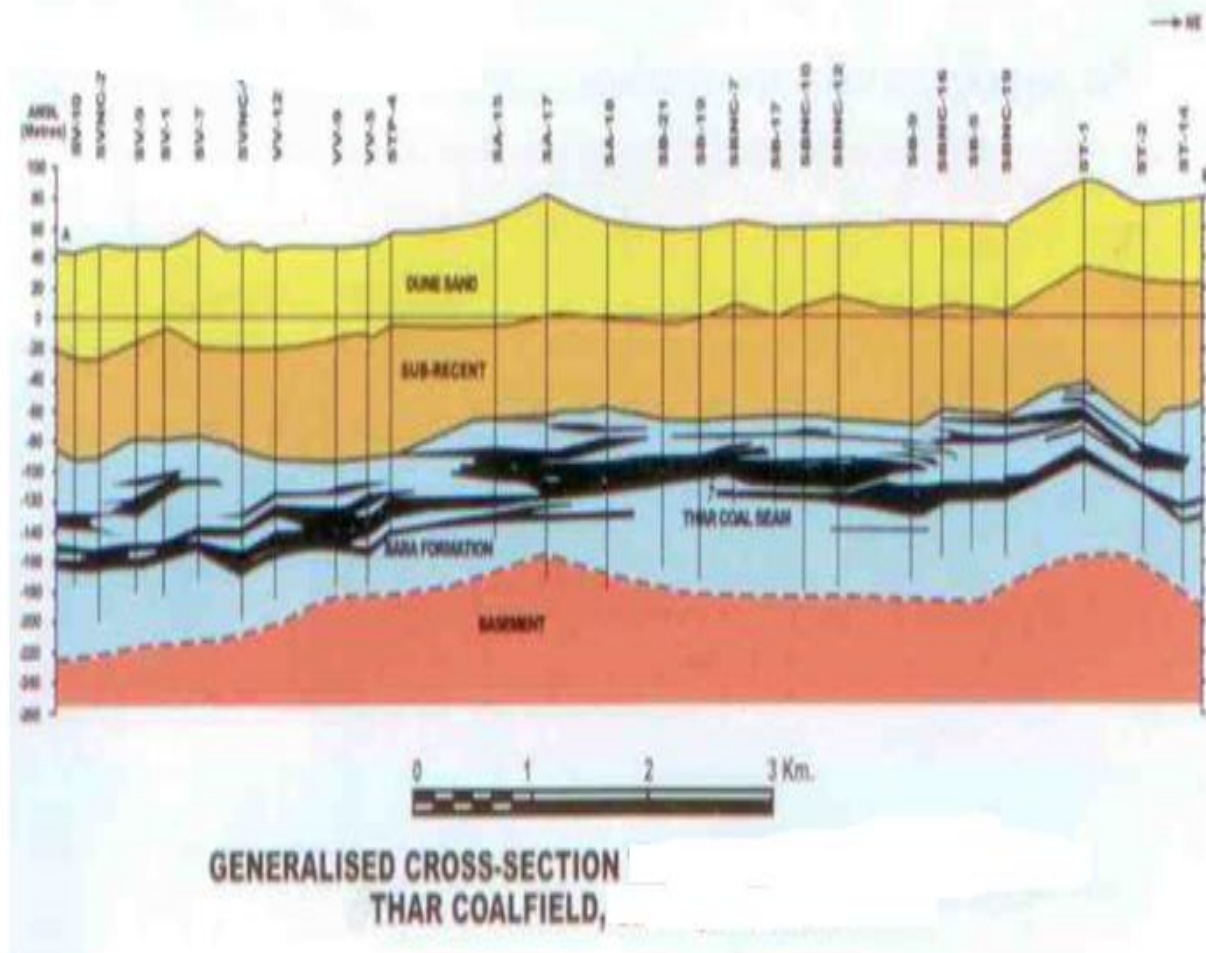
Background about the Discovery of Thar Coal Reserves

- The tangible indications that coal was present beneath the sands of the Thar Desert came with the drilling of five water wells by the British Overseas Development Agency (ODA) in collaboration with the defunct Sindh Arid Zone Development Authority (SAZDA).
- Water drill hole ODA2 was drilled in 1988 near the village of Khario Ghulam Shah about 15 km east of Islamkot. The descriptions of cuttings from this well noted "Carbonaceous Shale" between depths of 126-129m.
- On the basis of the presence of coal in ODA2 water well the Geological Survey of Pakistan (GSP), and United States Geological Survey (USGS) examined and described drill cuttings from other nearby SAZDA wells in March 1989.
- The hole No.TH-5 was geophysical logged along with other holes and it was estimated the total coal present in well was 19 m. Further confirmation of the coal presence in Thar Desert exploration program was carried out by drilling 4 boreholes.
- In October 1992, the Geological Survey of Pakistan (GSP), and United States Geological Survey (USGS) began a 21 bore holes exploration program to define the magnitude and geographic limits of the Thar Coal field.
- In 1993, an additional 10 bore holes were drilled under a contract with the John .T. Boyd Company under the auspices of USAID, additional 03 drill holes were also drilled by GSP under the auspices of USAID.
- The studies proved that Thar coalfield is spread over an area of more than 9100 square kilometers with dimensions of 140 km (north-south) 65 km (east-west) having 175.506 billion tones of Lignite (coal), categorized "A" to "B".
- The GSP carried out the drilling program for development of the blocks for further proven coal reserves from 1994-2000 and Blocks I, II, III and IV were developed.
- In 2005-2006, Sindh Coal Authority developed Block V and VI through foreign firm viz. Northeast Coalfield Geological Survey Bureau, China.
- In 2008-09, Sindh Coal Authority developed Block VII, VIII and extended the block III up to 56 Sq.km (i-e Block III-B) through a local company viz. M/s Deep Rock Drilling Pvt. Limited.

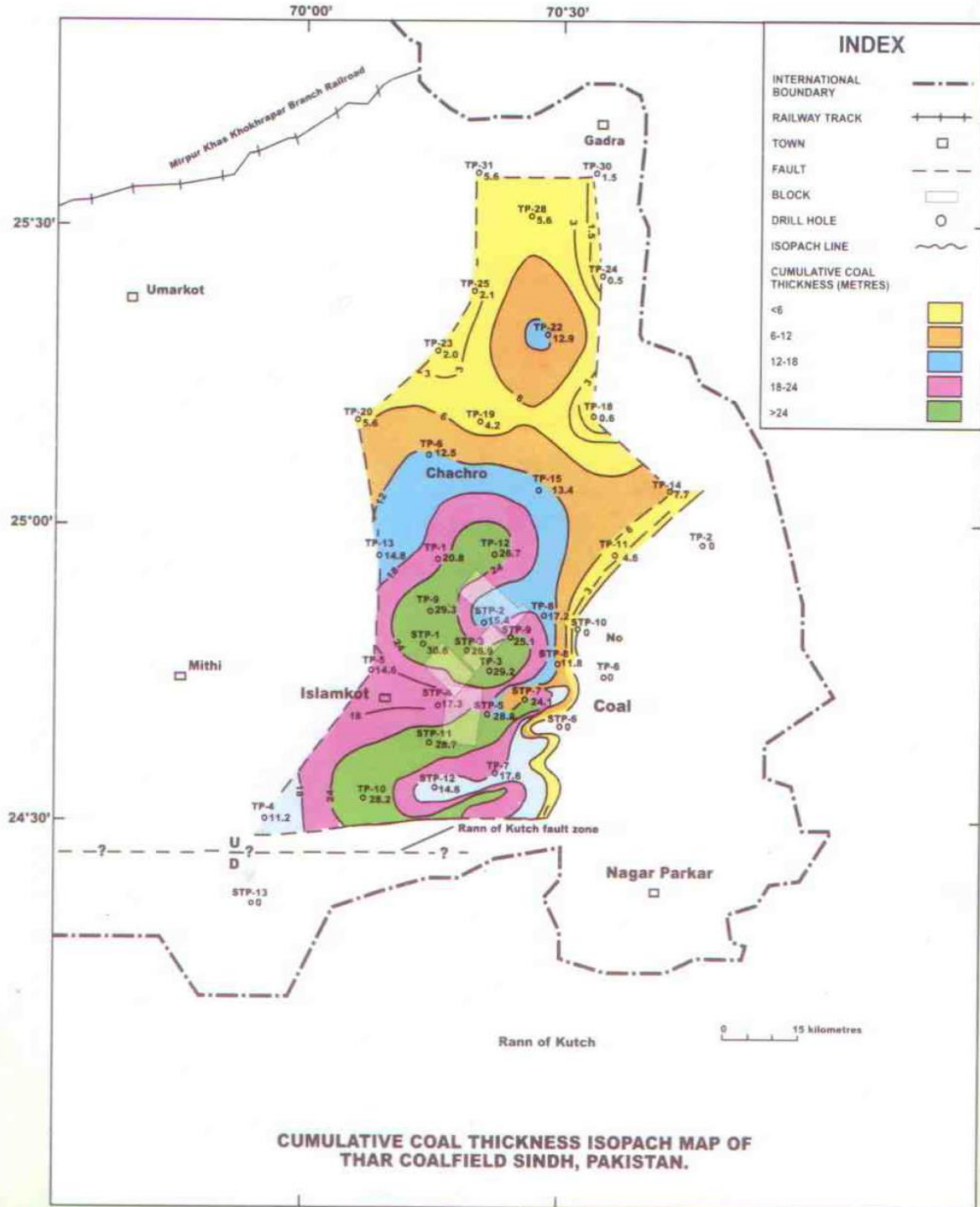
General Geology of Thar

The studies conducted so far, show that the Thar coalfield rests directly on relatively shallow, rifted basement rocks of late Pre-Cambrian age. The area is completely covered by sand dunes. On the basis of drill hole data, four sub-surface litho-stratigraphic units have been identified. The units are dune sand (recent), Alluvial deposits (sub-recent), Bara formation (Paleocene and Basement Complex (Pre-Cambrian). The Due sand (50-90 meters) comprises sand silt and clay.

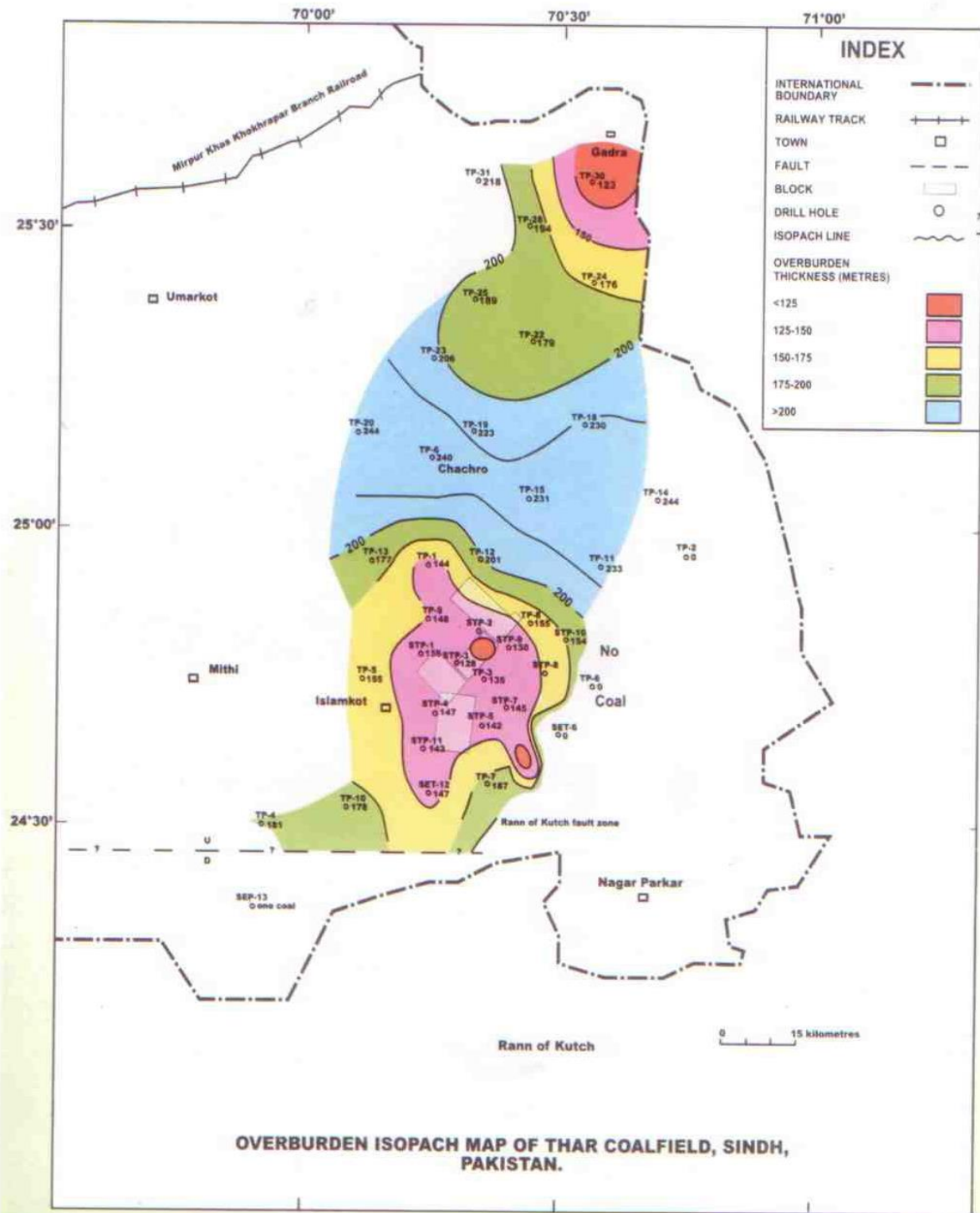
Alluvial Deposits (11-127 meters thick) comprise sandstone, siltstone and clay stone. The Bara formation (50-125 meters thick) consists of clay stone, shale, sandstone and coal, whereas, the basement complex comprises mainly of granitic rocks. The drilling data has indicated three aquifers (water-bearing zones) at an average depth of 50, 120 and more than 200 meters.



Cumulative coal thickness Isopach map of Thar Coalfields



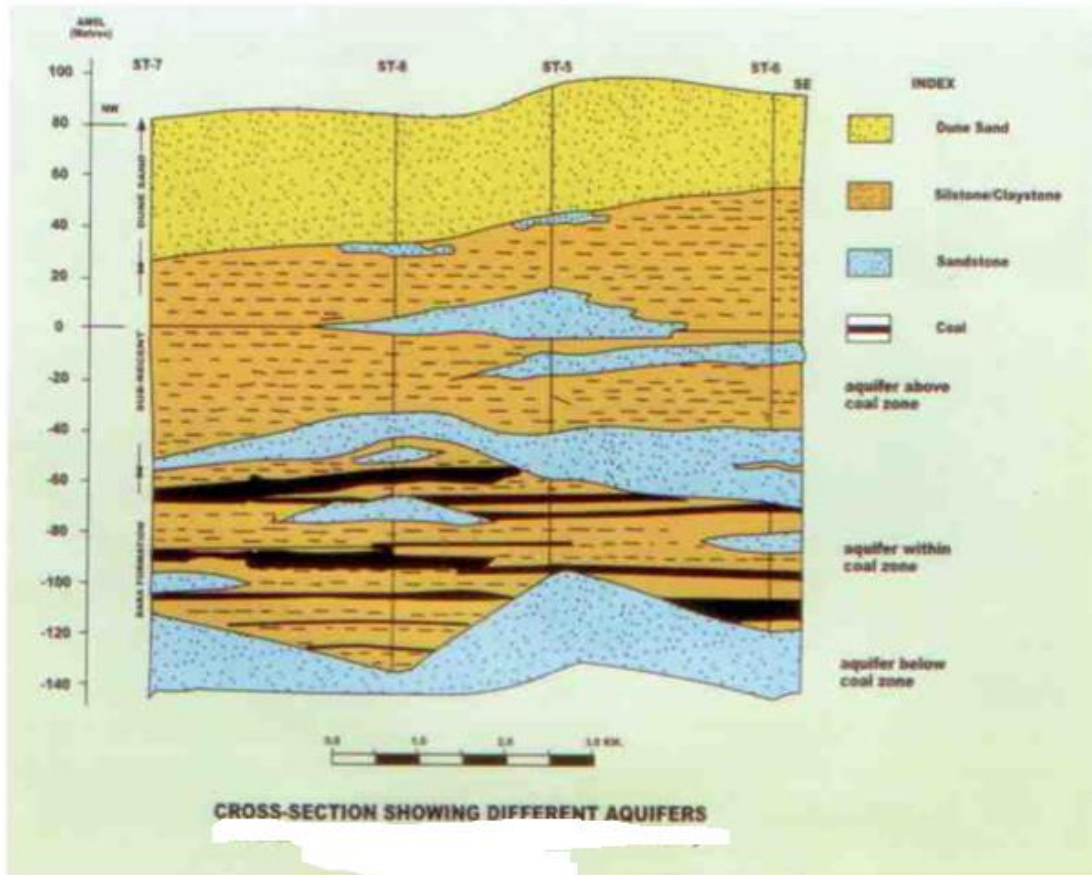
Overburden Isopach of Coalfield Pakistan



Ground Water Source. The past investigation drilling revealed that the coal is in-seams with extractable thickness of 22 m at a depth of 110 m up to 200 m. The upper seam layer of coal reserve also reportedly contains in-situ water. A recent, bankable feasibility study in the block 1 area has given the following information:

Groundwater is present in mainly three different horizons.

- The **base aquifer** with pump tested transmissivities of 7.9×10^{-3} and 1.8×10^{-3} m²/s is extending throughout the exploration area at a thickness of about 60 meter. This aquifer has an extension in the Thar Desert of about 15,000 km². Recharge is possibly from the Northeast beyond the Indian border.
- The **middle aquifer** is composed of a variety of mainly disconnected sand lenses and channels with partly high silt content and low permeability within the lignite bearing Bara Formation and the Sub-recent Formation. Recharge to these aquifers is likely to be poor.
- The Dune Sand Formation acts as a **top aquifer** with a water column of few meters only at the formation base on top of the Sub recent. Permeability here is in the range of 10-5 m/s. Recharge of this aquifer is direct through rainfall infiltration.



Groundwater qualities are saline in all aquifers with dominant sodium chloride contents. TDS is around 7500 in the base aquifer of the exploration area and 4500 in the top aquifer at the village of Varvai. The top aquifer at the village of Tilvai shows extreme high values in the order of up to 11,000/14,000 TDS.

Surface-Water Source.

In order to address the cooling water requirement for Thar based power plants, government of Sindh has launched a major water supply scheme with a total cost of more than 9 Billion PKR. This water can be used in power plants after treatment. Sindh Irrigation & Drainage Authority (SIDA) is implementing the scheme and 100 Cusecs water will be treated at Nabisar and then transported to Vajihar a location near Thar Blocks. The Scheme will be completed by 2015.

As an alternative for possible consideration of getting required water resources to the said mining complex including passing by towns and villages is to divert the surface water from the Nara Canal System, which takes off from Sukkur Barrage in the Northern area of the desert, and runs along the Western boundary of the Thar Desert area until it drains into sea through Left Bank Outfall Drain (LBOD) and KPOD. In particular, when it comes to the vicinity of Thar mines area in Tharparkar district, the Nara main canal branches out into distributaries. The nearest branch canal to the area is Mithrao Branch canal. A water pipeline for the domestic water supply to the existing towns and villages has been constructed from one of the Noakot distributary of the Mithrao Branch. This pipeline is used to supply water to the population of Mithi area which is the district head quarter of Tharparkar district including few other villages and towns of the district. Being tail-end of the system, water is supplied weekly through a pipeline of 12 inches diameter with multiple booster pumping stations. The current pipeline has capacity possibly to meeting the current water requirements but may not be enough for the future plants and population of the complex under consideration. In order to provide fresh water to Thar Coalfields, the Government has approved a scheme for supply of 300 cusecs fresh water from Nara Canal.

ENVIRONMENTAL ASPECTS

Area Description

Thar coalfield is a part of the Thar Desert. It is bounded in the north, east and south by India, and in the west by flood plains of the Indus River. The terrain is sandy and rough with sand dunes forming the topography. The relief in the area varies between near sea level to more than 150 meters above sea level.

The climate is essentially that of an arid to semi-arid region with scorching hot summers and relatively cold winters. The main livelihood of the population is dependent on agriculture and livestock rearing. Both the activities depend on rainfall, which is sparse, often erratic and falls between July and September. After the rains, the desert subsoil aquifers are recharged and the pasturelands are regenerated. However, by February, the aquifers are mostly depleted and the pasturelands dry up.

Fauna in the Block I-X

This area is home to species of birds and animals including the Chinkara (*Gazelle benetti*), desert fox (*Vulpes vulpes griffithi*), Jackal (*Canis aureus*), Mongoose and the Sindh Peacock (*Pavo cristatus*). Other birds found in the area are partridge (*Favoncolinus pondocarianus menaesis*), Barn owl (*Tyto alba*), Indian scops owl (*Otus bakkarnoena*), Sindh Night Jar (*Caprimulgus maharattensis*), and Dove (*Streptopelia senegalensis*). Venomous snakes viz khapar (Sindh Rattler) and Cobra are common in the rainy season. Vegetation consists mostly of stunted scrub and bush although trees such as the hardy kandi (*Prosopis cineraria*) do occasionally dot the landscape. The main natural ground cover is provided by grasses which are nutritive and a palatable fodder for the livestock. The people therefore are not engaged in agriculture as intensely as the rest of rural Pakistan.

National Legislation, Regulations and Policies

The cornerstone of environmental legislation is the Pakistan Environmental Protection Act of 1997 (PEPA), which superseded the Pakistan Environmental Protection Ordinance of 1983. The Act establishes the general conditions, prohibitions, and enforcement for the prevention and control of pollution, and the promotion of sustainable development. The Act also establishes and delineates the powers and functions of the Pakistan Environmental Protection Council (PEPC), Pakistan Environmental Protection Agency (Pak-EPA), provincial Environmental Protection Agencies (EPAs), and Environmental Tribunals. In particular, the Act creates the authority for delegation of environmental management functions to the provincial EPAs. Nothing in the Act prohibits provincial governments from adopting more stringent standards or regulations.

Under the PEPA, the Federal government has the authority to delegate any of its environmental management functions and powers to provincial governments, government agencies, or local authorities. Provincial governments in turn may delegate powers to any lower-tiered government agency. This provision establishes a framework for environmental federalism within which

environmental management responsibilities are shared amongst Federal, provincial and local governments. Environmental federalism is built on the belief that governance is strongest when implemented at the level closest to the beneficiary, and which was further promoted in Pakistan by the Local Government Ordinance of 2001, which introduced a new system of local government aimed at promoting responsibility at the local level. According to this Ordinance, rural and urban local councils were responsible for “the prevention of pollution of water or land from such sources and in such manner as the by-laws may provide.”

According to PEPA, no development program can be undertaken unless an initial environmental examination (IEE) or an environmental impact assessment (EIA) is conducted, and approval is received from the federal or relevant provincial EPA. The categories of programs, for which an EIA or IEE has to be carried out, are defined in the Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000. In Sindh the guidelines for the preparation of IEE and EIA are the same general guidelines that were prepared by Pak-EPA in 2000. The Pakistan EPA has issued several guidelines and policies and procedures for preparation of EIAs. In consultation with SEPA, TCAP will devise specific environmental guidelines for opencast mining in Sindh.

Below are links to different Pakistan EPA issued guidelines:

- EIA Guidelines & Overview (PDF-76 KB)
- EIA Graphics Overview (PDF-148 KB)
- Front Sheet (PDF-45 KB)
- Policies & Procedures for review & approval (PDF-206 KB)
- Guidelines for preparation and review of Environmental Report (PDF-393 KB) Guidelines for Public Consultation (PDF-209 KB)
- Guidelines for Sensitive & Critical Areas (PDF-312 KB)
- Pakistan Environmental Legislation & Environmental Quality Standards (PDF-110 KB)
- Sectorial guidelines for Environmental Reports, Major thermal Power Stations (PDF-213 KB)
- Sectorial guidelines for Environmental Reports, Major Chemical & Manufacturing Plants (PDF-222 KB)
- Sectorial guidelines for Environmental Reports, Industrial States (PDF-192 KB)
- Sectorial guidelines for Environmental Reports, Major Roads Guidelines (PDF-202 KB)
- Sectorial guidelines for Environmental Reports, Sewage Schemes (PDF-208 KB)
- Sectorial guidelines for Environmental Reports, Oil & Gas Exploration and Production (PDF-173 KB)

SOCIAL ASPECTS & RELEVANT LABOR LAWS

Tharparkar district is located at the extreme southeast corner of the Sindh province. It is one of the poorest and most under-developed districts of Sindh Tharparkar district is spread over an area of 22000 square kilometers and has a population of more than one million. The District is divided into three ecological zones-the south-eastern is hilly and is rich in mineral deposits, the

central area is with sand dune, and on the west is the barrage area which is fertile. During the summer the climate is very hot and dry, while winter are not as intensive and harsh as compared to summers. The rainfall varies year to year. Most of the rainfall is received in monsoon period of July to August. Despite the abundance of sand and sand dunes, Thar is an area with crops growing and cattle grazing.

Demography of the Tharparkar District

Population Census 1998 depicts that total population of Thar district is about one million, concentrated into four Talukas (sub district), Mithi, Diplo, Chachro and Nagar Parker. The area of the Thar district is 22000 km:² yielding a population density of 46.6 persons/km². The urban population is only 4.36% of its total population and the rest of 95.64% is rural population. The urban growth rate is 2.7% and rural growth rate is 3.15%. Both urban and rural growth rate has declined as compared to 1972-81 census which was 6.6% and 4.88% respectively. The average growth rate during 1981-98 is recorded at 3.13% as reported during 1981-98 census. In 1961 the population of Thar was 396,000. In 1981 it had increased to 774,617. Now the population of Thar is estimated around 1 million. It means that in the first twenty years (1961 — 1981) it increased by 95% and that in later 17 years (1981 — 1998) has reduces and become 77% increase. The average growth rate is 3.9% per year, which is higher than the national average.

Age Structure of the Tharparkar District

The Thar district population pyramid shows a very high proportion of population under 5 years which is a total of 18.21%. The percentage below 15 years is 50.28% of the total population. The population aged below one year is 2.65% which is infant population of Thar district. The population of the working age group i.e. 15 to 64 years is 45.98% and 3.78% belonging to category above 64 years of age. The population of the adults is 44.73% in which 42.45% male and 47.37% female. Census report 1998 has categorized the various age groups, such as: 50.28% lies below the age of 15. In which 18.21% are below the age of 5 and 2.65% in infant's category. 32.07% lies between the ages 5 to 15. The survey conducted showed that 56.2% population live in joint family system and 43.8% live as separate couples along with their children. Some 35.9% families having toilet facility and 76.5% having separate kitchen facility.

Sex Ratio of the Tharparkar District

The sex ratio (male per 100 female) in the Thar district is 120,6, the ratio in urban area 112 and in rural area 121. The sex ratio differs at various age groups in the district. The fluctuation of ratio at various age group is indication of uneven distribution of population in the district.

Age group	All area			Rural area			Urban area		
	Both sex	Male	Female	Both sex	Male	Female	Both sex	Male	Female
<1 year	2,65	2,94	2,29	2,66	2,96	2,30	2,25	2,46	2,02
<5 years	18,21	19,29	16,91	18,37	19,48	17,02	14,89	15,12	14,63
< 10 years	36,41	38,04	34,44	36,71	38,41	34,66	29,64	29,49	29,81
<15 years	50,28	52,33	47,82	50,61	52,73	48,05	43,04	43,02	43,06
Between 18years-21 years	44,73	42,54	47,72	44,45	42,18	47,21	50,80	50,87	50,72
	38,34	36,66	40,37	38,09	36,32	40,23	43,88	44,33	43,38
Between 15 and 40 years	39,12	37,37	41,23	38,75	36,91	40,48	47,24	47,81	46,60
Between 15 & 64 years	35,98	44,19	48,15	45,61	43,74	47,88	54,05	54,32	53,75

Table 2.1-3: Population of age groups, sex and urban/rural areas in percentage

Social Structure in the Tharparkar District: Communities and Castes

The Tharparkar district has a highly heterogeneous population that lives peacefully without any inter-religion or sectarian hostility. The main Muslim castes are Memon, Nohri, Rahuma, Junejo, Sarneja, Halepota, Khaosa, Syed, Bajeer, Samma, Khaskhali, Dal, Mehar, Panhwar, Chandio, Nareja, Fageer, Sand, and Khokar. The Hindu Castes include Thakurs, Mahraj, Birhman, Mahshwari, Lohana, Menghwar, Kolhi, Bheel and Bajeer. In Thar district generally and block 1 area particularly mostly Sindhi is spoken, while Dhatki accent is common in both Muslim and Hindu communities.

After the 1971 war the estimated Hindu migrated from Tharparkar to India are reported to be 4,000 in numbers. Due to the drought condition in Thar, which normally repeat after three to four years, and is responsible for low rainfall directly effecting the food and fodder for man and cattle, force the population to migrate to the irrigated part of the Sindh province (district Badin, Thatta, Mirpurkhas). That is normally from December to May. Small landowners (Farmers) and tenets temporary migrate with livestock with the male members and with their families to the other part of the province for the survival of the livestock.

Education and Social Services

Thar district has a literacy ratio of 18 % according to the 1998 censuses. In the urban area there is 57.27% literacy ratio where as in the rural area 16.35% population is found to be literate. The male literacy ratio was 28.33% and the female literacy ratio was 6.91%. In rural area male literacy is five-times higher to the female literacy ratio,

Cultivation

The locals sow the seeds at every possible place that shows promise of fertility. The main crops are guar and millet mixed with lentils, till, and melons. After the rains the Thar Desert supports extensive grass growth with rains which provide high value feed to livestock. As the rains do not come to the desert every year, the area in the map showing cultivated land stays uncultivated in the dry years and is used for grazing.

The main asset of local people is grazing animals. In a good year the grasses grow and trees provide fodder. In periods of drought, the situation can turn dire for both. The animal population is estimated to be around 4 million cattle heads. Grazing lands represent a major part of land use in Tharparkar. Previously, people migrated with their livestock in the dry seasons to the Indus flood plains and the barrage areas. This helped the pastureland back home in Thar to regenerate. This migration has becoming increasingly difficult as the barrage areas and flood plains have now been brought under extensive cultivation, leaving limited opportunities for Thari livestock to graze. Concurrently, there has been a marked increase in the animal and human population of Thar. Combined these changes have resulted in over grazing of pasturelands.

Cultural and Historical Heritage

The Thar district is rich in cultural heritage. The remoteness of the area, the absence of means of proper communications and transport, and the inadequacy of basic amenities in the desert has discouraged immigration in the district. This had rewarding effect on its culture, which has retained its pristine purity. However, there is no cultural or historical heritage located in and around the vicinity of the selected site area. Khario Ghulam Shah is the biggest village among the three villages in the vicinity of study area. It has three graveyards in total, out of which one for Muslims and two for Hindus, according to their caste. Conversely, Tulwai has only one graveyard for the infants. In general the dead bodies are taken from Varvai and Tilvai to Khario Ghulam Shah for the burial. There are no burial sites located in and around the vicinity of the selected site area.

Existing Labor legislation and implementing agencies

Under the Constitution of Pakistan, minerals, except uranium, oil, and natural gas, falls under the ambit of the provincial governments. Mineral oil and natural gas come under the joint jurisdiction of the Federal & Provincial Government (Article 172 (c) of 1973 Constitution 18th amendment) . The Central Inspectorate of Mines, a subordinate office of the Ministry of Labor, Manpower and Overseas Pakistanis, was created in 1966 to look after matters relating to the safety, health and welfare of workers engaged in federally-controlled mines. Similarly, Provincial Inspectorates of Mines were established under the respective provincial departments

for the administration and implementation of the Mines Act of 1923 in mines under their jurisdiction.

This institutional structure has only recently begun to change with the merger of the Inspectorate of Mines and the Directorate of Mines into the Directorate General of Mines. The first Indian Mines Act, passed in 1901, contained provisions on safety and health, but it was not until the Mines Act of 1923 that any restrictions were imposed on the employment of labor. The 1923 Act, contains *inter alia* provision for the exclusion of children under 13-years, the grant of a weekly holiday and the limitation of weekly hours to 60 above ground and 54 below ground. The Act was supplemented by two elaborate series of regulations; one relating to coal mines and one to other mines. In addition, rules were framed by provincial governments. After 1923, two important changes were made in the law. The amending Act of 1928 provided that no mine shall be open more than 12 hours in 24, unless on a system of shifts, and that shifts must not exceed 12 hours and must not overlap. The regulations of March 1929 prohibited the employment of women underground. The different legislation relating to mines empowers the federal and provincial governments to make regulations for providing for the safety of persons employed in mines, their means of entrance and exit, the number of shaft out-lets to be furnished, the fencing of shafts, pits, outlets and pathways, safety of roads and work place; the ventilation of mines and the action to be taken in respect of dust and gases; and the regulation of the use of all machinery.

Name	Remarks
The Mines Act, 1923	Administered by the Central and Provincial Inspectorates in the mines of their respective Jurisdiction
The Thar Coal & Energy Board Act, 2011	The Provincial Assembly of Sindh has approved the TCEB Act in June, 2011. The TCEB having provincial and federal representation is working as on stop organization to facilitate and regulate the coal mining sector in Sindh.
The Coal Mines Regulations, 1926	Administered by the Provincial Inspectorates only in the coal mines of their respective jurisdiction
The Mining Board Rules, 1951	As above
The consolidated Mines Rules, 1952	
The Metalliferous Mines Regulations, 1926	As above.
Sindh Coal and Mines (supplementary) Regulations, 1986.	By the Inspectorate of Mines Sindh in every mine falling in Sindh other than oil, gas and uranium mines
Sindh Coal Authority Act 1994	Work on draft Sindh Coal Act is in process under auspicious of Energy Department, Government of Sindh

There had been many SR0s/notifications/ amendments issued since the last Sindh Coal Act. However, the original and valuable commentary remained unchanged. Beside, the editorial quality of the labour Code has been enhanced considerably. The reference material on notifications/amendments or new mining statutes, rules and regulations relating to the subject of '*labour*' can be acquired from the Inspectorate of Mines Labour Welfare, Labour and Manpower Departments of the Federal and Provincial Governments.

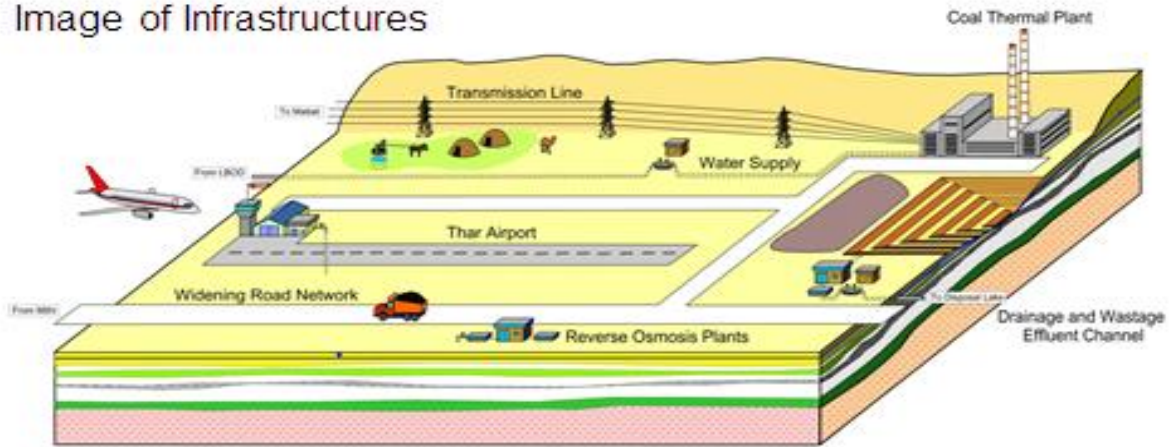
Status of Existing Blocks

Development of the Thar Coal Field presents an unprecedented opportunity for the investors. Its development will have dramatic impact on the overall energy and economic setting in which the Pakistan operates. It is essential that the development of the Thar Coal Field, which will include large-scale coal mining, power generation and an array of new infrastructure, will have positive and lasting impacts on the people and economy of Pakistan.

Thar Coal Blocks	Status/ Timelines
Block-I Global Mining Company of China Open cast Mining of 10 mtpa 900 MW Coal supply to local thermal plants and cement industry	Bankable Feasibility completed March, 2012 Coal Production planned by 2015-16 Power Generation Planned by 2015-16
Block-II Sindh Engro Coal Mining Company (JV: 51% GoS; 49% Engro) Open cast mine of 6.5 mtpa & 600MW	Bankable Feasibility completed August 2010 Project financing activity continued. Sovereign Guarantees by GoP for Mining & Power approved by ECC to facilitate lending by Chinese Financial Institutions Overburden removal to begin in 2014 and will take 3.5 years to reach Coal seam.
Block-V UCG Pilot Project Under Ground Coal Gasification Project & Power Plant Planned	38 bore holes have been drilled. Test Burn done in Dec. 2011 and Syn gas being produced. Procurement of Purification Plant is in process. Power Plant of 8-10 MW is being established
Block-VI Oracle Coalfields, PLC (UK) Open cast mine of 2.2 mtpa	Detailed Feasibility Completed Start of Mine development to begin by mid-2014 JDA signed with KESC for 300 MW in July, 2012 JDA Signed with SEPCO China for 600 MW in Sept 2013 ESIA Public Hearing was held on 27 th June 2013

Infrastructures for Thar Coalfield

Image of Infrastructures

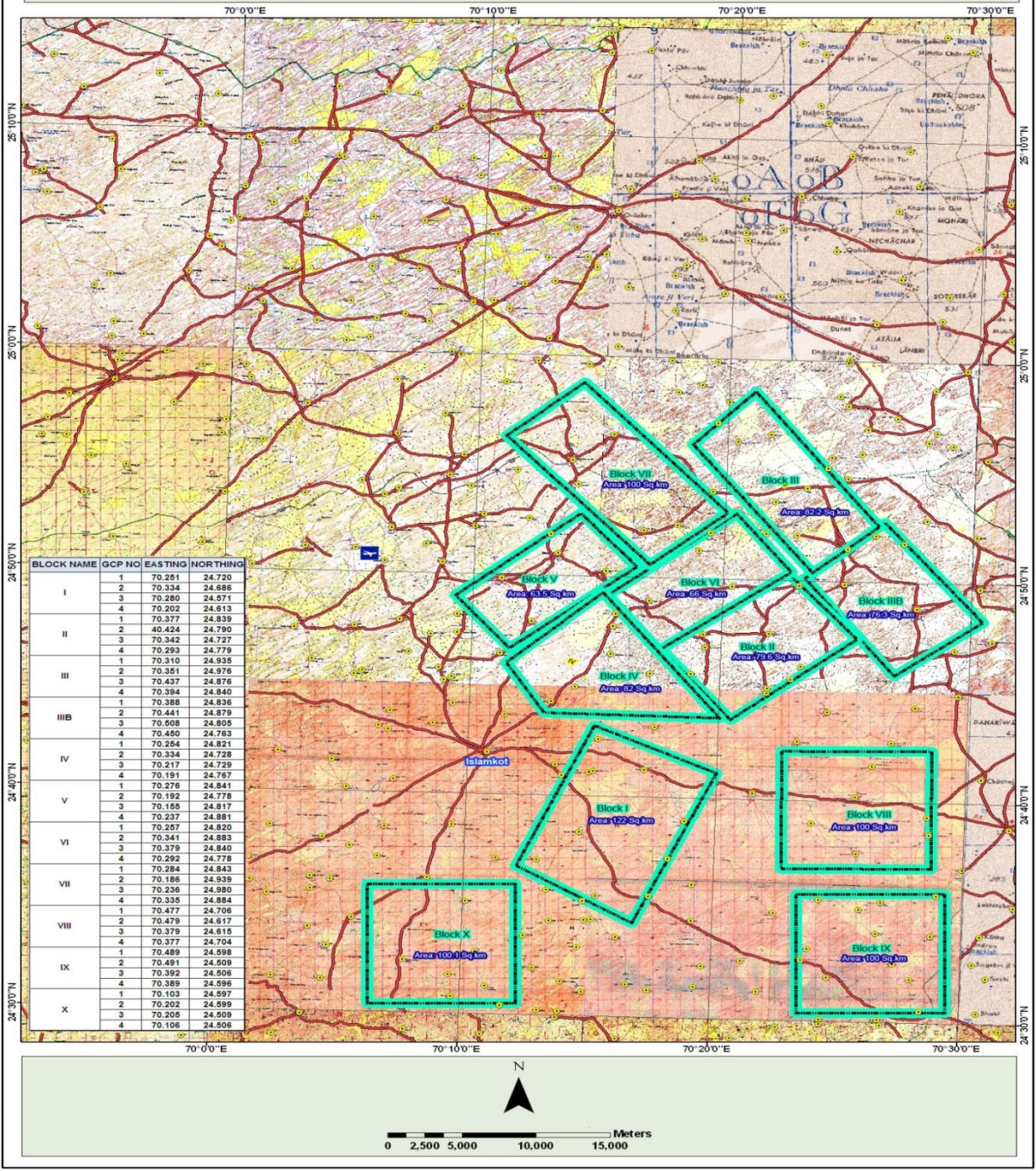


Name of Scheme	Total Cost	2013-14 Allocated
Improvement of Road	Rs 12.57 bn	Rs. 4.74 bn
Water Supply	Rs 9.1 bn	Rs. 2.0 bn
Mine Water Disposal	Rs 3.5 bn	Rs. 3.174 bn
Airport	Rs. 0.97 bn	Rs. 0.24 bn
Reverse Osmosis	Rs. 3.2 bn	Rs. 1.117 bn

Infrastructures for Thar Coalfield



THAR COALFIELD BLOCKS LAYOUT



Part IV

Technical details of the Blocks Offered

Block-III

Location and accessibility

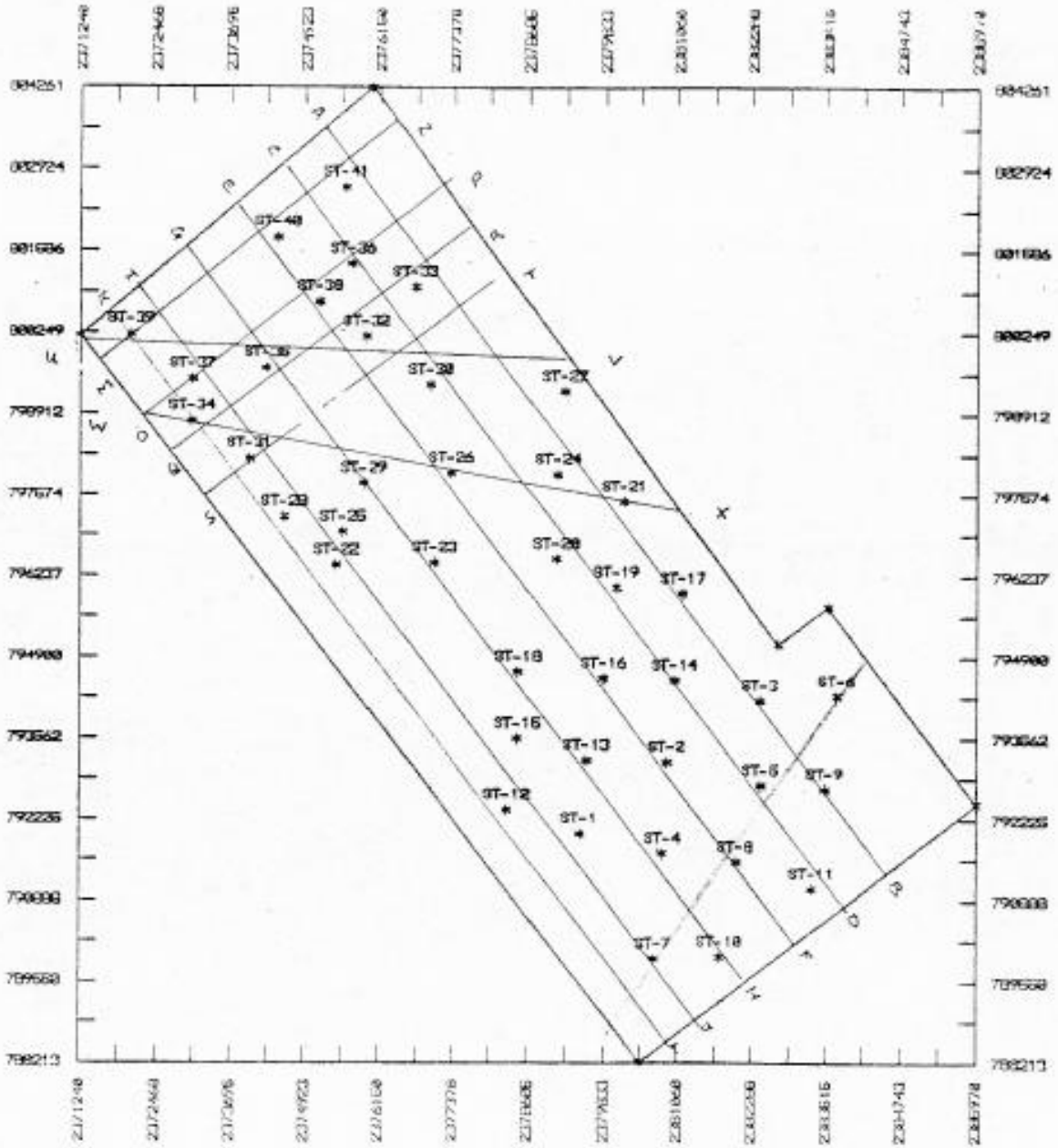
- Topo Sheet Sr. No: 40 L/5
- Name/Blocks: III, Saleh Jo Tar
- Area (Sq-Km): 99.5 sq.km.
- Latitude: 24°49' 0" N & 24°57' 28"N
- Longitude: 70°27'49"E & 70°18'36"E

The Saleh Jo Tar, Block-III, covers an area of 99.5 sq.kms and falls in central part of the Southern Thar Coalfield. The field area is covered by stabilized sand dunes trending in northeast direction longitudinally. It is approachable by all weathered road up to 10 km. beyond Mithi and onwards by four-wheel driven vehicles through desert sand. It has coal resources of 2008 million tons in clastic sediments of Bara Formation. The measured reserves are 413 million tons. The cumulative coal thickness varies from 7.15 to 24.58 meters. The coal benches range in thickness from 0.20 to 14.65 meters. The minimum depth at which the coal is present is 114 meters. 90% of the coal can be extracted up to -120 meters AMSL depth, where as 85% of the coal resources lie between -50 and 110 meters AMSL. The chemical analyses of the coal samples show that the weighted average of Ash content is 6.14%, fixed carbon 19.56%, moisture 45.41%, volatile matter 28.51%, sulfur 1.12% and Btu/lb. 6268. The rank of coal is lignite. Clay stone and loose sandstone beds form the roof as well as the floor rock of coal benches. The palynological studies show that the Thar coals are Paleocene to Eocene in age and may have been deposited in a raised bog environment. Kaolin layers are present and possibility of radioactive anomalous zones also exists.

Relief Topography and Climate

The area of Saleh Jo Tar Block-III (Fig-1), falls in Survey of Pakistan Topo sheet No.40- L/5 and is between Latitude 24° 49' 0" N and 24° 57' 28" N and Longitude 70° 18' 36" E and 70° 27' 49" E. in the southern part of Thar desert of Sindh Province, Pakistan. The block is 4 kms North West of Vakrio and east of Maghu Bhil village. The terrain is sandy and rough with sand dunes forming high topography. The intervening valleys are narrow and sometime broad. Sand dunes cover about 50% of the area of the block. The relief in the area varies between 60 and 122 meters AMSL and attains maximum height of 158.53 meters (520 ft.) at Pakka Kochi in the south east part of the study area (Fig-4). The sand dunes are mostly longitudinal with a NESW trend and are stabilized by shrub vegetation and grass. The drainage system is lacking in the area. The water from the occasional monsoon rain flows to a short distance into the lower interdunal valley and is either immediately absorbed or remains for couple of weeks. The area is part of Thar Desert; as such the climate is similar to semi-arid region with scorching hot summers and cold

winters. The mean annual minimum and maximum temperatures are 19° to 35° C, respectively. Maximum daily temperature commonly exceeds 45° C in April through June.



General Geology

The Thar coalfield area is all covered by dune sand which extends to an average depth of over 79 meters. The extensive drilling for coal in the area shows that the coal bearing strata of Paleocene-Eocene sediments overlies unconformably over the Pre-Cambrian basement rocks of igneous composition which are exposed at Nagar Parker and form the only outcropping rock exposures in the area. The generalized stratigraphic sequence is shown below and comprises of dune sand, alluvial deposits, coal bearing Bara Formation of Paleocene-Eocene sediments and Basement complex.

Stratigraphic Units in Thar Coal Field

Formation	Age	Thickness	Lithology
Dune Sand	Recent	36m to 79m	Sand, silt and clay
-----Unconformity-----			
Alluvial deposits	Sub-Recent	55m to 127m (variable)	Sandstone, siltstone Claystone, mottled
-----Unconformity-----			
Bara Formation	Paleocene to Early Eocene	+75m (variable)	Claystone, shale, sandstone, coal, carboniferous claystone
-----Unconformity-----			
Basement Complex	Pre-Cambrian	--	Granite (gray, pink) & quartz diorite

Cumulative coal thickness Isopach map

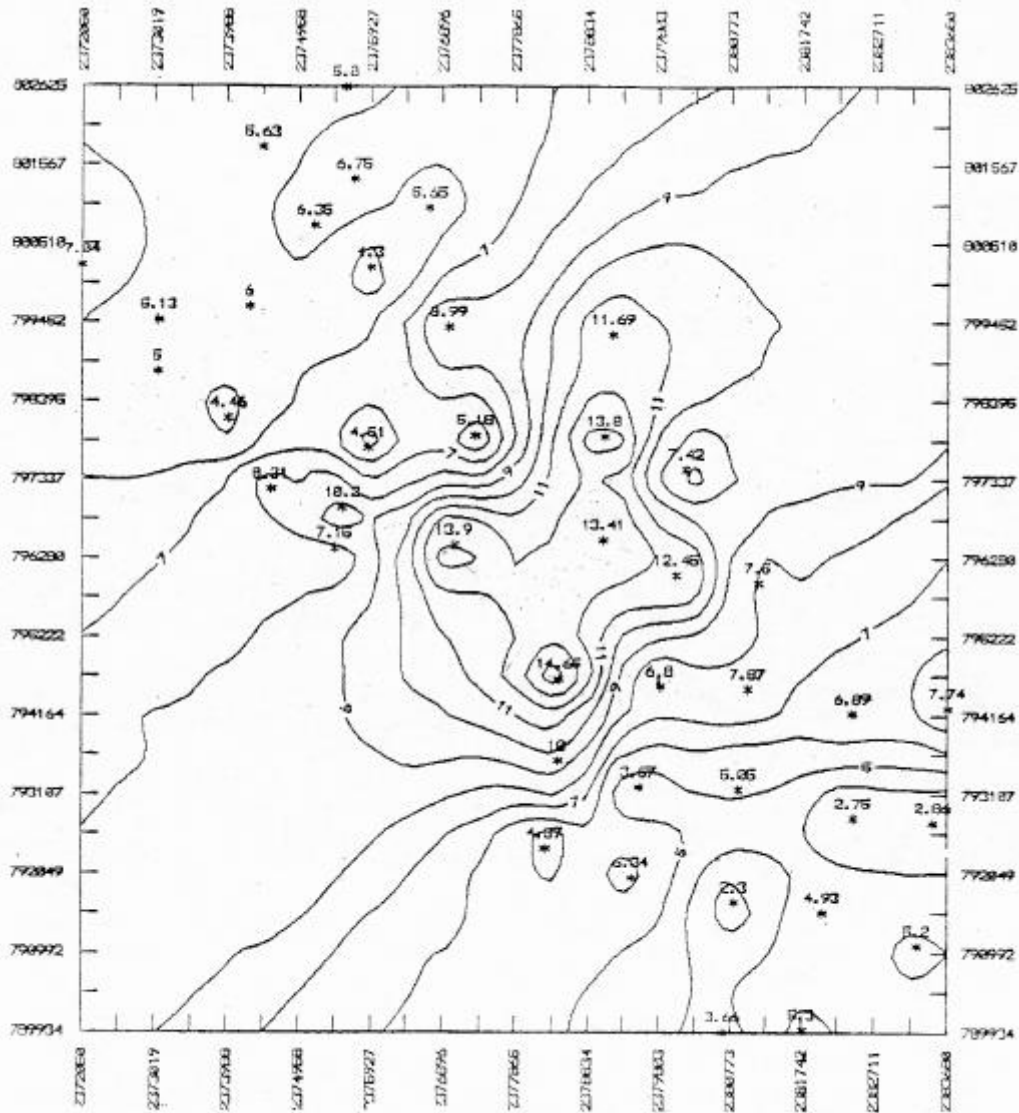


FIG-13. ISOPACH MAP OF THICKEST COAL BENCH OF SALEH JO TAR.

- Chemical Composition: (As received)

Moisture %:	45.41%
Ash %:	6.14%
Volatile Matter %:	25.49%
Fixed Carbon%:	19.56%
Sulphur %:	1.12%
Heating value Btu/lb:	6268

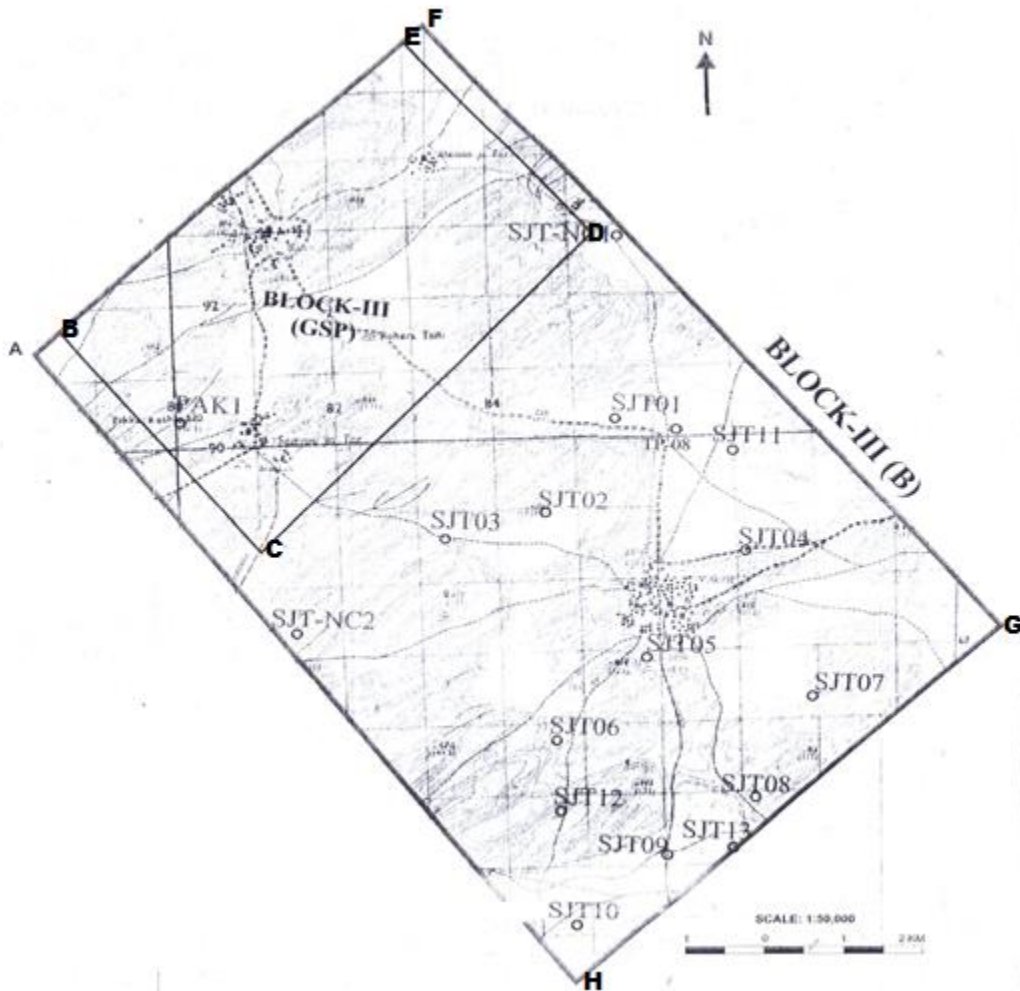
Cumulative Reserves of Block-III

Measured	412.75 million tones
Indicated	1337.01 million tones
Inferred	258.28 million tones
Total Reserves all categories	<u>2008.04 million tones</u>

Block-III (B)

Location and accessibility

- Topo Sheet Sr. No: 40 L/5
- Name/Blocks: III (B), Saleh Jo Tar
- Area (Sq-Km): 59.18 Sq Km (Excluding Overlapping area of Block-III)
- Latitude: A 24 49'47" B 24 50'2" C 24 48'55" D 24 50'51" E 24 52'11"
F 24 52'23" G 24 47'57" H 24 45'25"
- Longitude: A 70 23'17" B 70 23'35" C 70 24' 31" D 70 27'19" E 70 26'15"
F 70 26'29" G 70 30'28" H 70 27'0.4"



Relief, Topography and Climate

Since Block-III (Saleh jo Tar) and III (B) are part of Thar Desert, the topography of the terrain covering these blocks is similar to the general topography of the whole Thar district, which is characterized by typical eolian deposits. The whole area is covered by numerous longitudinal sand dunes stabilized by herbs and shrubs, with intervening narrow and broad valleys, both trending NE-SW. Besides inter dunal valleys, there are flat tracts of land present at several locations in Thar, and also in Block-III (B). Full-grown trees are found scattered through these tracts of flat and slightly undulating surfaces. The dunes are longitudinal ranging in relief from tens of meters to hundreds of meters. In Block-III (B), the highest (at Pakka kotha) and lowest points are 158.50 m and 91 m respectively with a relief of 67.5 meters in the area. Rain-fall is very scanty, and only comes in monsoon during the months of June to September. But there can be several years in a row completely without rains. The annual average rainfall ranges between 200 mm to 300 mm. Rain-fall being so rare and terrain so dry, porous and permeable, no regular drainage pattern could have developed in the area. Even heavy downpour is immediately absorbed into the sands of Thar. The temperatures in summer range between 30°C and 35°C, whereas during winter they range from 16.4°C to 22.6°C.

General Geology of Block-III B

Stratigraphic sequence on the Coalfield

Formation	Age	Lithology	Thickness
Dune Sand	Late Pleistocene to Recent	Sand, silt and Clay	51m – 90.70m
.....Unconformity.....			
Sub-Recent deposits	Pleistocene	Sandstone, siltstone	51m – 175.04m
.....Unconformity.....			
Bara Formation (Coal bearing)	Mid Paleocene to Early Eocene	Claystone, Shale, Siltstone, Sandstone and Coal	31.33m – 82.41m
.....Unconformity.....			
Basement Complex	Pre-Cambrian	Gray and pink granite	-

- Cumulative coal thickness Isopach map of coalfield Pakistan

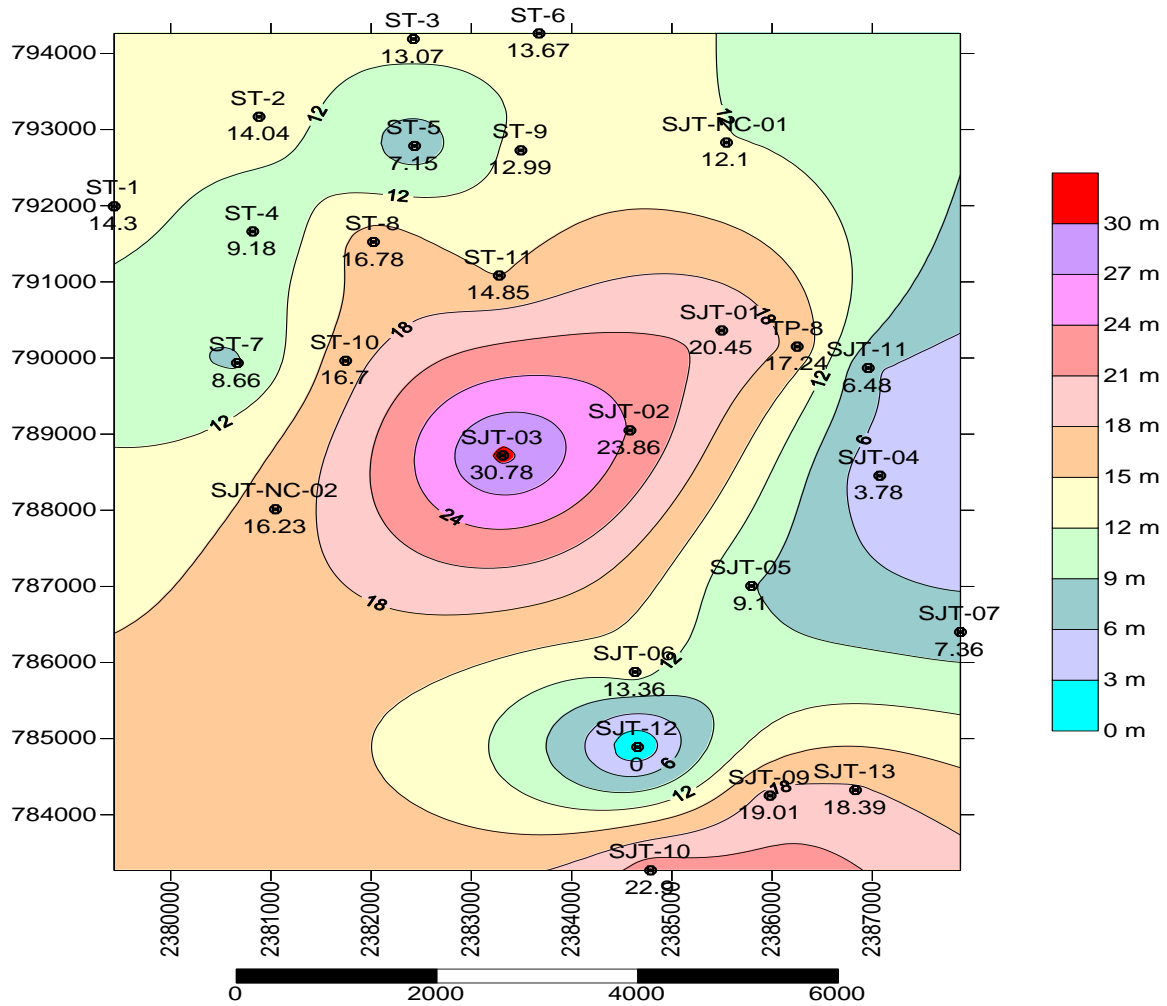


FIG-8a: COMPOSITE ISOPACH MAP OF CUMULATIVE COAL THICKNESS OF BLOCK-III (GSP) AND BLOCK-III (B), THAR COALFIELD, SINDH, PAKISTAN.

- Overburden Isopach of Coalfield Pakistan

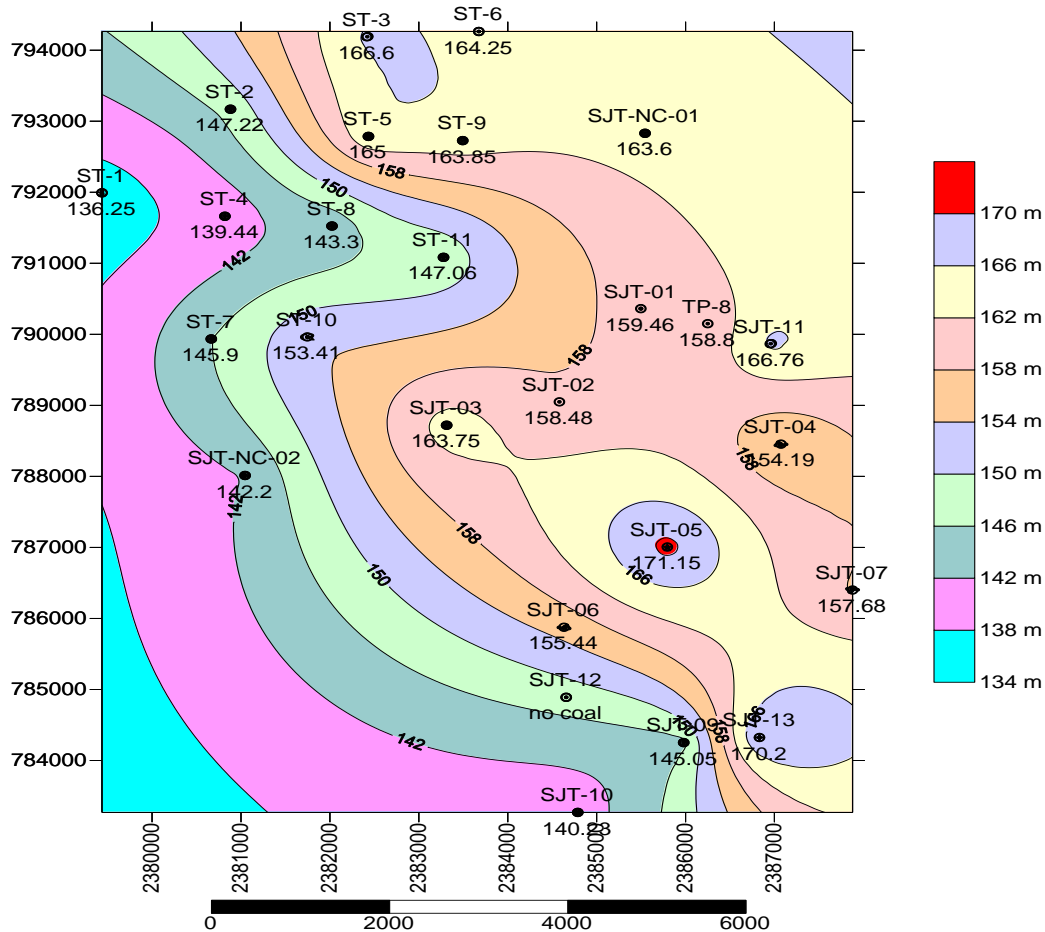


FIG-10a: COMPOSITE ISOPACH MAP OF OVERBURDEN OF BLOCK-III (GSP) AND BLOCK-III (B), THAR COALFIELD, SINDH, PAKISTAN.

- Chemical Composition : (As received)

Moisture %:	47.72%
Ash %:	9.30%
Volatile Matter %:	25.49%
Fixed Carbon%:	16.79%
Sulphur %:	1.15%
Heating value Btu/lb:	4808

Cumulative Reserves of Block-IIIB

Measured	133.51 million tones
Indicated	604.29 million tones
Inferred	1010.65 million tones

Total Reserves all categories

1010.53 million tones

Block-IV

Location and accessibility

- Serial. No: 40 L /1,2,5 & L/6 (Topo Sheet No.)
- Name/Blocks: **Sonalba, Block-IV**
- Area (Sq-Km): 82sq-Km
- Coordinates

GCP	Latitude	Longitude
1	70.254	24.821
2	70.334	24.728
3	70.217	24.729
4	70.191	24.767

Relief, Topography and Climate

The area of Sonalba Block-IV is 25 km east of Islamkot and 2km from Mehari village. The terrain is sandy and rough with sand dunes forming high topography. The intervening valleys are narrow and sometimes broad. Sand dunes cover about 50% of the area of the block. The relief in the area varies between 61.00 and 157.66 m (473ft) AMSL west of Sonalba in the Northwest part of sandy area. The sand dunes are mostly longitudinal with a NE-SW trend and are stabilized by shrubs vegetation and grass. The drainage system is lacking in the area. The water from the occasional monsoon rains flows to a short distance into the lower interdunal valleys and is either immediately absorbed in or retained on the surface for a couple of weeks.

The area being part of desert is climatically similar to semi-arid region with scorching hot summers and cold winters. The mean annual minimum and maximum temperatures are 19 and 35 Degree centigrade respectively. Maximum daily temperature commonly exceeds 45 degree centigrade in April through June.

General Geology of Block IV

The geology of the Thar Coal fields area is not easy to comprehend as the area is mostly covered by sand dunes. The nearest exposed outcrop is of granite basement rock found at a distance of 145 km at Nagarparkar. The basement rocks also contain subordinate rhyolite and metamorphic rocks.

The Thar coal fields are all covered by sand dunes, which extends to an average depth of over 79m. The extensive drilling for coal in the area shows that the coal bearing strata of Paleocene-Eocene sediments overlie uncomfortably over the Precambrian basement rocks of igneous composition which are exposed at Nagarparkar.

Stratigraphic sequence on the Coalfield

Formation	Age	Lithology	Thickness
Dune Sand	Recent	Sand, silt and Clay	36 to 79 meters
..... Unconformity			
Alluvial deposits	Sub recent	Sandstone, siltstone, claystone molted.	55 to 127 meters (Variable)
..... Unconformity			
Bara Formation	Paleocene to Early Eocene	Claystone, Shale, Siltstone, Sandstone , Coal, and carboniferous claystone	+75 m (variable)
..... Unconformity			
Basement Complex	Pre-Cambrian	Gray and pink granite Quartz diorite	-----

Coal

The sonalba Block IV contains coal beds of variable thickness range from less than 0.3 m to 20.20meters. the maximum number of coal seams encountered is 12, 16 and 31. The cumulative thickness of the coal bed ranges from 10.74 meters to 33.45 meters. Claystone is invariably forms the roof and floor rock.

The coal is brownish black to grayish black in color. It is poorly cleated to well cleated and compact. It contains scattered resin globules throughout. The quality of coal is better where percentage of clay is less.

Chemical Composition (As received)

Moisture%:	43.24%
Ash%:	6.56 %
Volatile Matter%:	29.04%
Fixed carbon%:	21.11%
Sulphur%:	1.34%
Heating value Btu/lb:	6391 Btu/lb

Reserves

Measured = 684.09 million tons
Indicated = 1711.28 million tons
Inferred= 176.14 million tons
Total= 2571.51 million tons

Block-VII

Location and accessibility

- Serial. No: 40 L /1 & L/5 (Toposheet No.)
- Name/Blocks: **Dhaklo, Block-VII**
- Area (Sq-Km): 100sq-Km
- Latitude: 24°38'33''N & 24°50'38''N
- Longitude: 70°11'11''E & 70°20'11''E

Relief, Topography and Climate

Since Block-VII is a part of Thar Desert, the topography of the terrain covering this Block is generally similar to the topography of the whole Thar district. This is characterized by typical aeolian deposits. The whole area is covered by numerous longitudinal sand dunes stabilized by herbs and shrubs, with intervening narrow and broad valleys, both trending NE-SW. Besides inter-dune valleys, there are flat tracts of land present at several locations in Thar as well as in Block-VII. Full-grown trees are found scattered through these tracts of flat and slightly undulating surfaces. The dunes are longitudinal, ranging in relief from tens of meters to hundreds of meters. In Block-VII, the highest point (east of Muhan Tar village) and the lowest point (SE of Dhaklo village) are 148.74 m and 87.47 m respectively with a relief of 61.27 meters in the area.

Rain-fall is very scanty, and only comes in monsoon during the months of June to September. But there can be several years in a row completely without rains. The annual average rainfall ranges between 200 mm to 300 mm. Rain-fall being so rare and terrain so dry, porous and permeable, no regular drainage pattern could have developed in the area. Even heavy downpour is immediately absorbed into the sands of Thar. The temperatures in summer range between 30°C and 35°C, whereas during winter they range from 16.4°C to 22.6°C.

General Geology of Block VII

Stratigraphic sequence on the Coalfield

Formation	Age	Lithology	Thickness
Dune Sand	Late Pleistocene to Recent	Sand, silt and Clay	54.86 to 91.45 meters
..... Unconformity			
Sub-Recent deposits	Pleistocene	Sandstone, siltstone	54.86 to 91.29 meters
..... Unconformity			
Bara Formation (Coal bearing)	Mid Paleocene to Early Eocene	Claystone, Shale, Siltstone, Sandstone and Coal	-----
..... Unconformity			
Basement Complex	Pre-Cambrian	Gray and pink granite	-----

- Cumulative coal thickness Isopach map of coalfield Pakistan

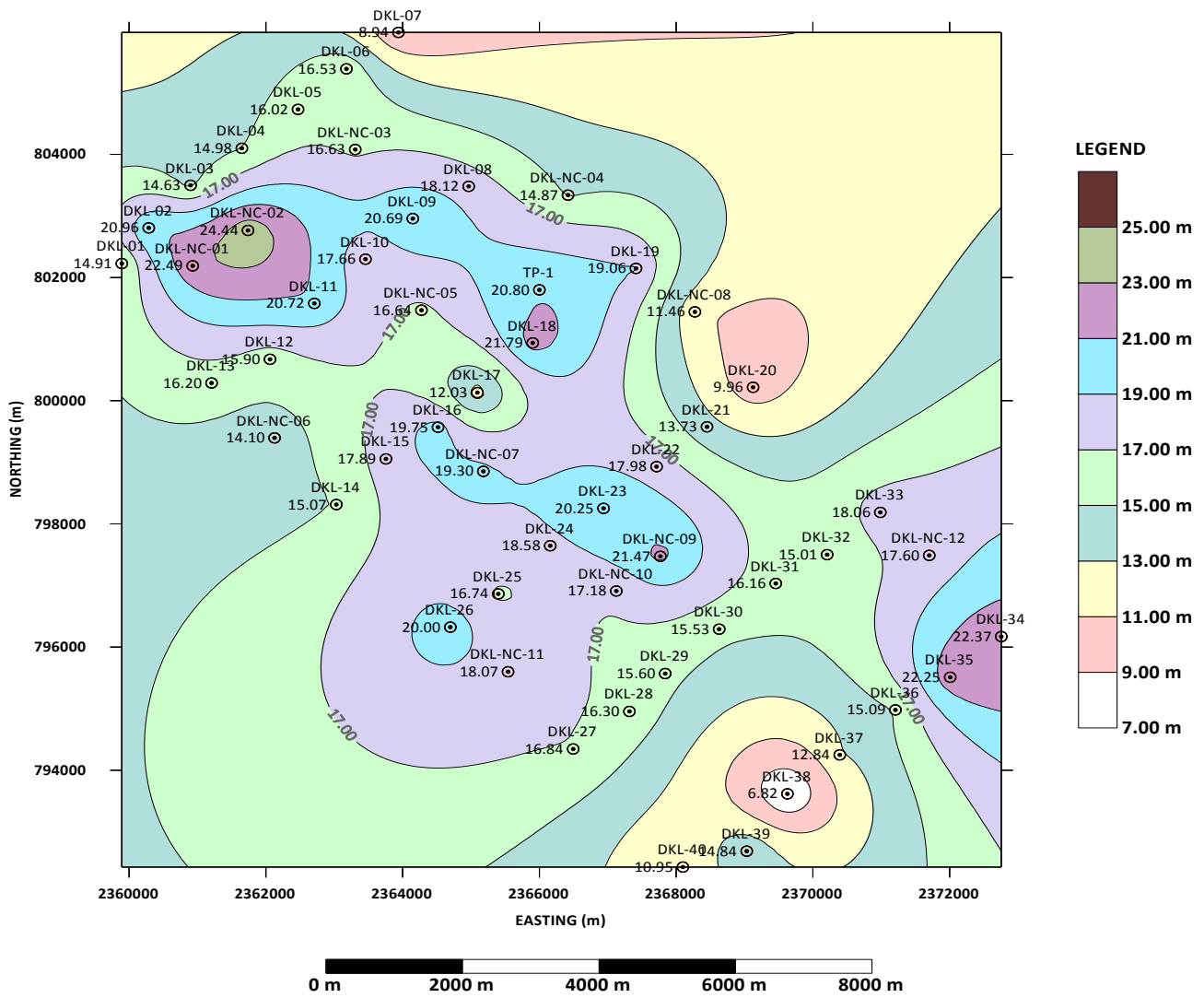


Figure-7: ISOPACH MAP SHOWING CUMULATIVE COAL SEAM THICKNESSES OF DRILLED BOREHOLES, BLOCK VII, DHAKLO, THAR COALFIELD, SINDH, PAKISTAN

- Overburden Isopach of Coalfield Pakistan

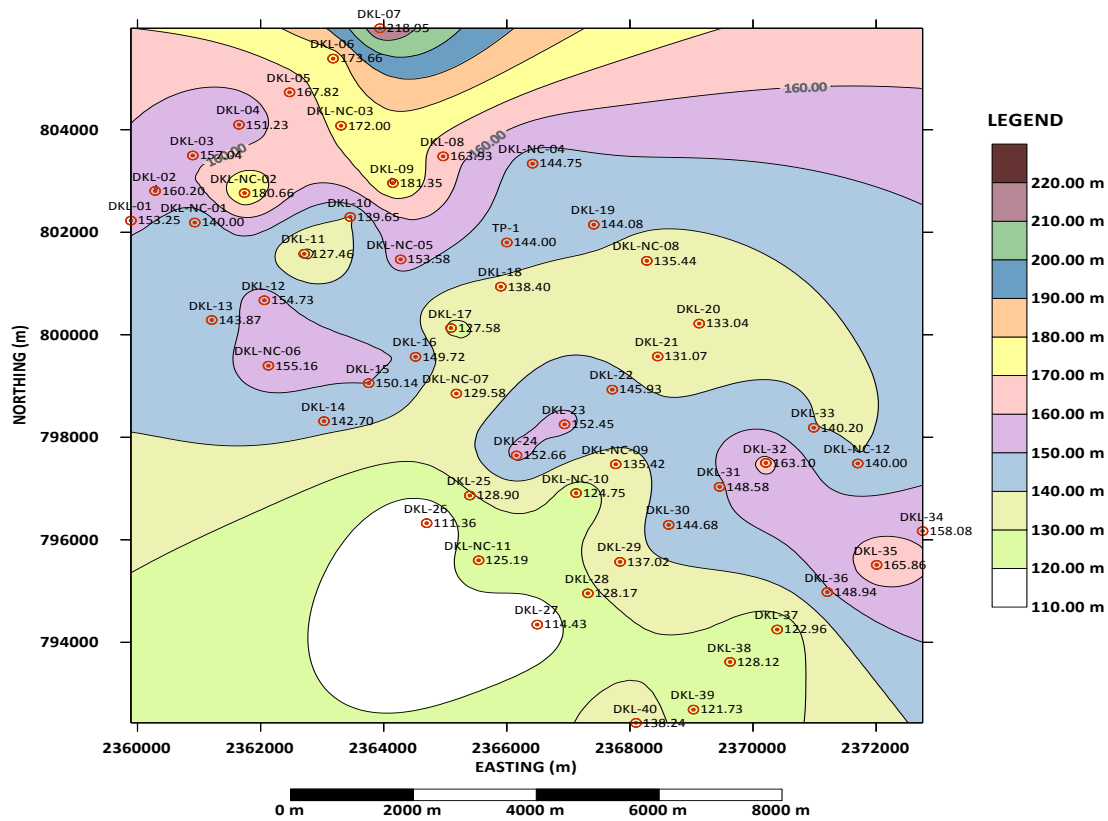


Figure-9: ISOPACH MAP SHOWING OVERBURDEN THICKNESSES OF DRILLED BOREHOLES, BLOCK VII, DHAKLO, THAR COALFIELD, SINDH, PAKISTAN

Chemical Composition (As received)

Moisture%:	48.27%
Ash%:	8.83 %
Volatile Matter%:	25.30%
Fixed carbon%:	19.56%
Sulphur%:	1.15%
Heating value Btu/lb:	5440.95 btu/lb

Reserves

Measured = 572.12 million tons
 Indicated = 1514.51 million tons
 Inferred = 89.15 million tons
Total = 2175.78 million tons

Block-VIII

Location and accessibility

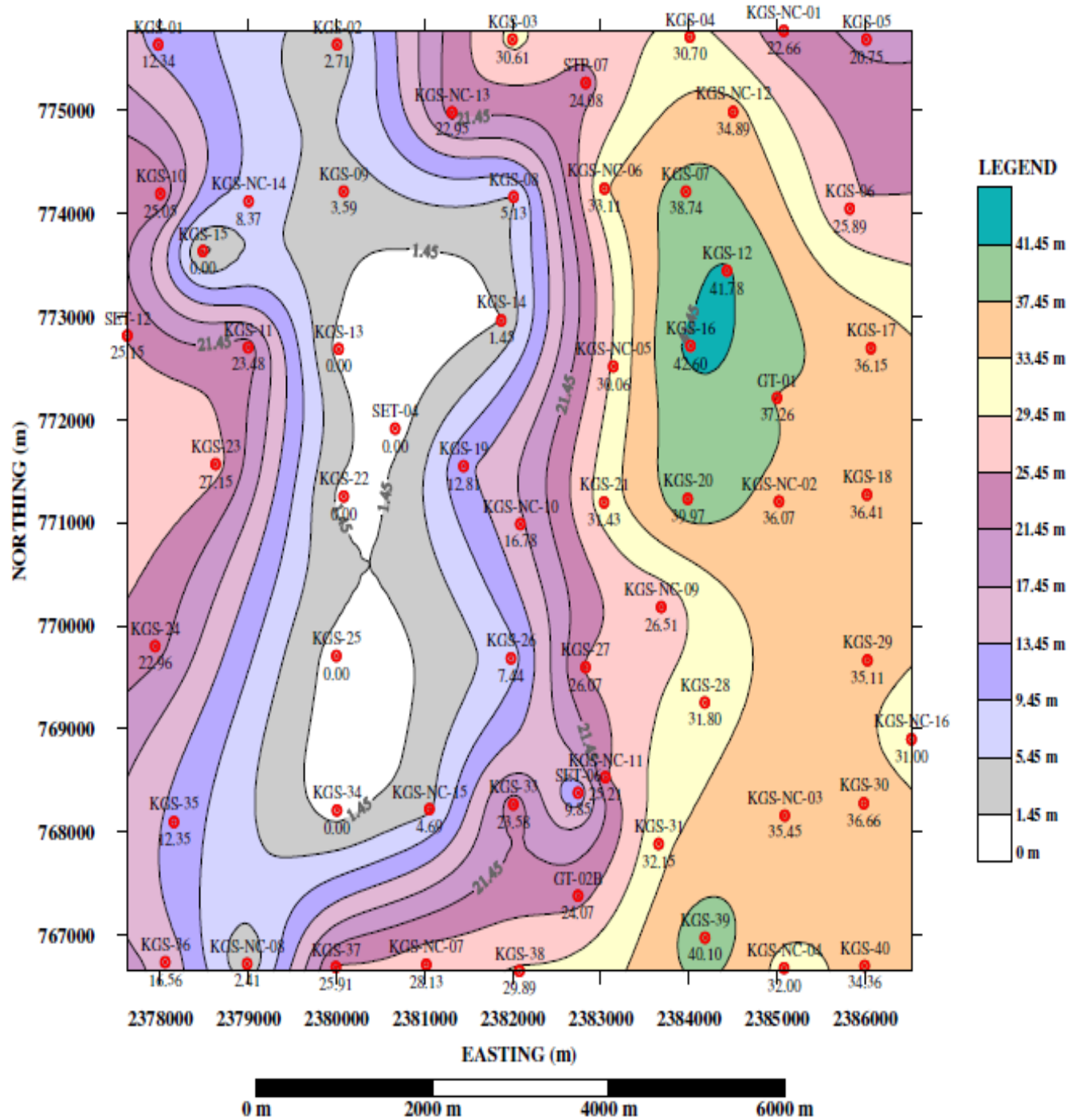
- Serial. No:- 40L/6
- Name/Blocks: Block-VIII, Khario Ghulam Shah
- Area (Sq-Km): 100 Sq.Km.
- Latitude: 24°37'00"N and 24°42'23"N
- Longitude: 70°22'30"E and 70°28'30"E

Relief, Topography, and Climate

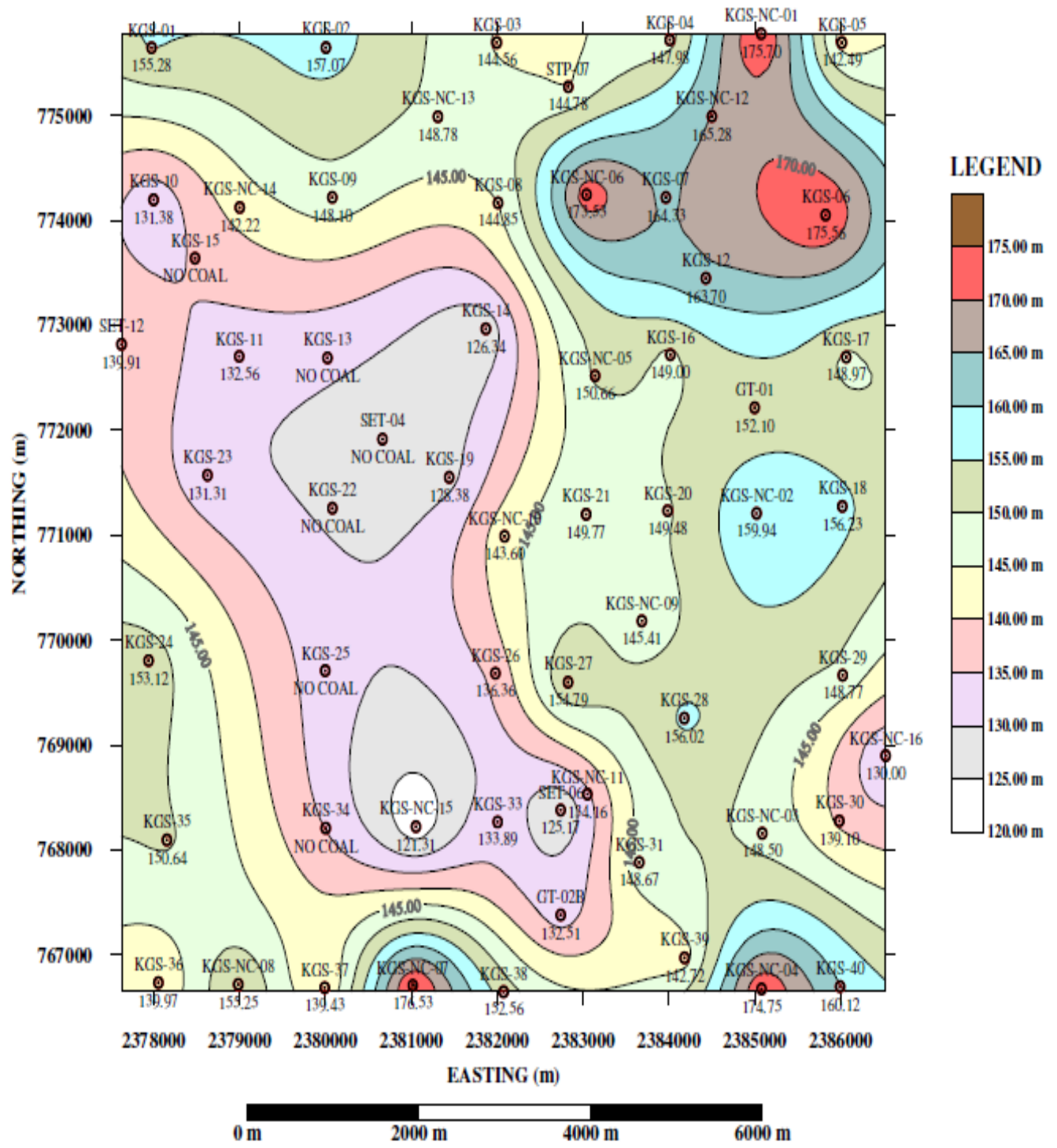
Since Block-VIII is a part of Thar Desert, the topography of the terrain covering this Block is generally similar to the topography of the whole Tharparkar district. This is characterized by typical aeolian deposits. The whole area is covered by numerous longitudinal sand dunes stabilized by herbs and shrubs, with intervening narrow and broad valleys, both trending NE-SW. Besides inter-dune valleys, there are flat tracts of land present at several locations in Thar Desert as well as in Block-VIII. Fullgrown trees are found scattered through these tracts of flat and slightly undulating surfaces. The dunes are longitudinal, ranging in relief from tens of meters to hundreds of meters. In Block-VIII, the highest point (Veri Wari Bhit, about 3 km NW of the village Ade Jo Tar that lies right on the road passing through the Block in the E-W direction) and the lowest altitude (along flat surfaces in between the dunes) are 140.82 m and 45.72 m respectively, with a relief of 95 m in the area.

Rain-fall is very scanty, and only comes in monsoon during the months of June to September. But there can be several years in a row completely without rains. The annual average rainfall ranges between 200 mm to 300 mm. Rain-fall being so rare and terrain so dry, porous and permeable, no regular drainage pattern could have developed in the area. Even heavy downpour is immediately absorbed into the sands of Thar. The temperatures in summer range between 30°C and 35°C, whereas during winter they range from 16.4°C to 22.6°C.

ISOPACH MAP SHOWING CUMULATIVE COAL THICKNESSES OF DRILLED BOREHOLES, BLOCK VIII KHARIO GHULAM SHAH, THAR COALFIELD



ISOPACH MAP SHOWING OVERBURDEN THICKNESSES OF DRILLED BOREHOLES, BLOCK-VIII, KHARIO GHULAM SHAH, THAR COALFIELD



Water Resources

Surface water

Owing to very little rainfall and dry hot climate coupled with sandy desert land, virtually no traditional resources of surface water such as rivers, lakes, dam reservoirs exist in Tharparkar District. People have dug large pits in the impervious clays at certain localities that are filled during the occasional rains, particularly in the monsoon season, which can serve the needs of the population and livestock for potable water for a few months. However, according to Records of Geological Survey of Pakistan, vol.115, 2002, the possible sources of surface water for use in the proposed power plants could be: (i) Left Bank Out Drain (ii) Jamrao Canal and (iii) the marshy land area in the Rann of Kutch.

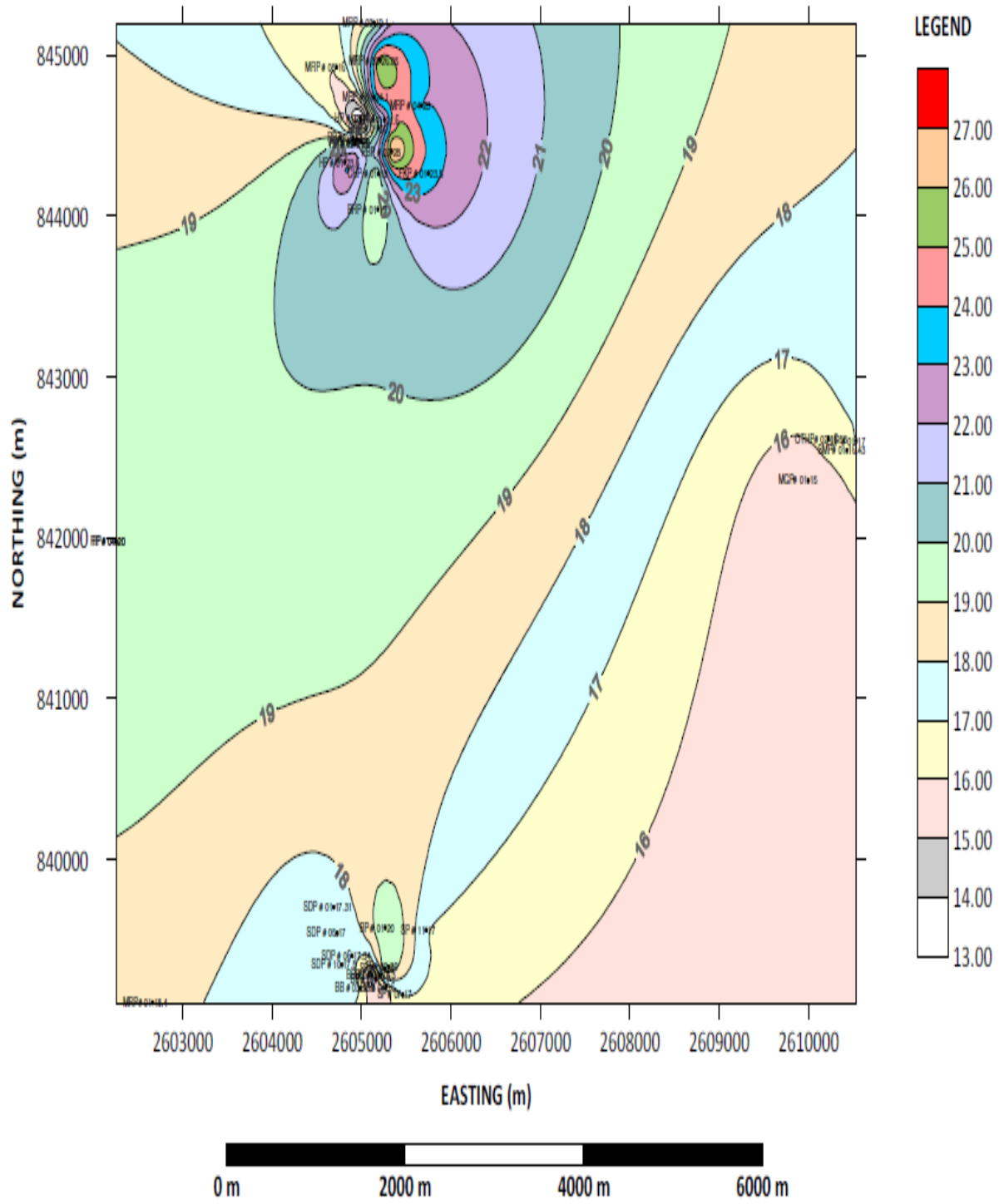
Groundwater

According to the hydrogeological investigations carried out by GSP (Records of Geological Survey of Pakistan, 2002, vol.115) a number of water wells that produce brackish water are present in the flat low-lying inter-dune playas. Some tube wells are also present. According to them drilling of boreholes has revealed the presence of three aquifers at variable depths: first above the coal zone, second within the coal zone and third beneath the coal zone.

Aquifers Above Coal Zone

A vertical zone about 80 m thick above the coal zone contains a number of aquifers; one at the contact of Dune sand and Sub-recent is almost persistent throughout the Thar coalfield at a depth of 50 to 90 m from the surface.

Water Level Contours of Shallow Aquifer in Block-VIII

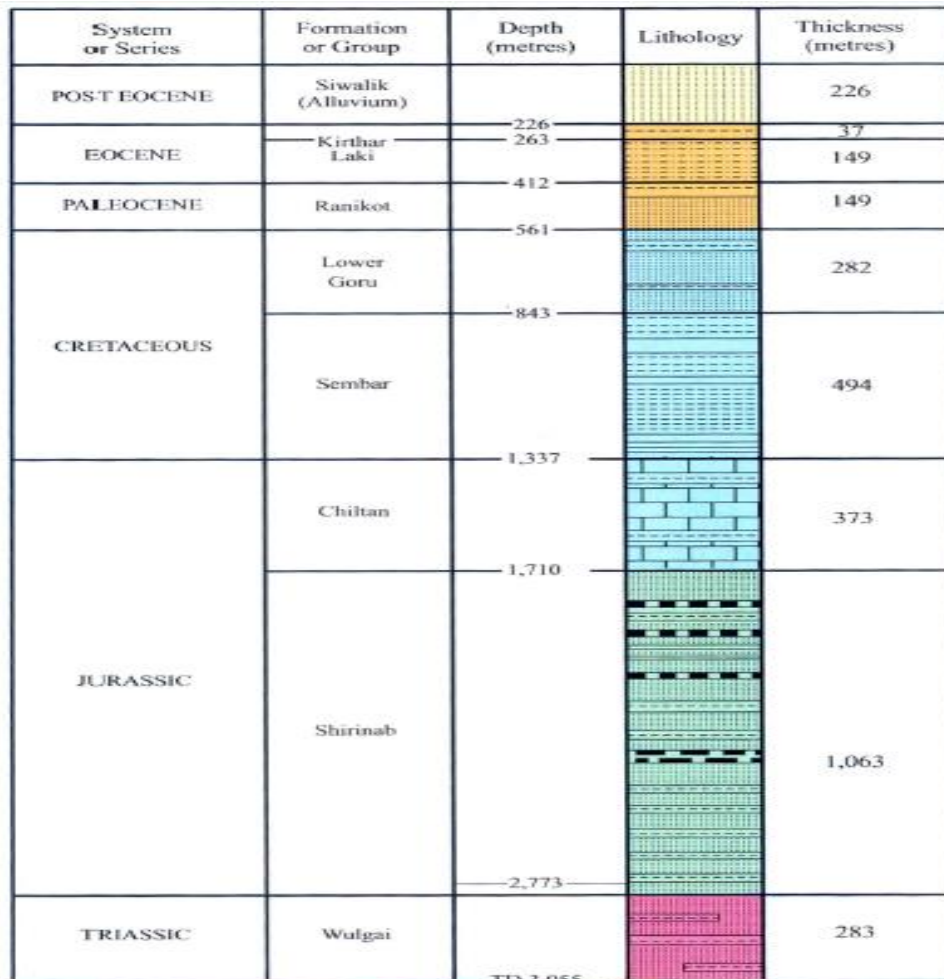


General Geology & Stratigraphy of Thar Coalfield

The stratigraphic sequence that is encountered in the area and the lithology of its various units are as follows:

Formation	Age	Lithology
Dune Sand	Late Pleistocene to Recent	Sand, silt and Clay
.....Unconformity.....		
Sub-Recent deposits	Pleistocene	Sandstone, siltstone
.....Unconformity.....		
Bara Formation (Coalbearing)	Mid Paleocene to Early Eocene	Claystone, Shale, Siltstone, Sandstone and Coal
.....Unconformity.....		
Basement Complex	Pre-Cambrian	Gray and pink granite

**A Generalized Subsurface Stratigraphic Succession is Shown in following Figure
(Ref. GSP IR No. 629)**



(AFTER FASSETT & DURRANI, USGS OPEN FILE REPORT, 1994)

Chemical Composition (as received)

- Moisture 49.57%
- Ash 7.78%
- Sulphur 1.44%
- Fixed Carbon 18.10%
- Volatile Matter 24.32%
- Heating Value 5302 Btu/lb

Cumulative Reserves

The method used for calculation of reserves is that of Circular No.891 of USGS:

- Measured 882.81 million tons
- Indicated 2131.36 million tons
- Inferred 21.68 million tons
- Total Reserves **3035.85** million Tons

Part V

The Proposal

Mining Concessions

Sindh Mining Concession Rules 2002 spell out concession award procedure available at our web site www.sindhcoal.gos.pk .

The successful applicant will get Exploration License after signing an MOU with SCA. The Exploration license is generally awarded initially for one year extendable on valid grounds, as these are developed blocks and BFS should not take more than a year.

The holder of an Exploration License shall fulfill all obligations as mentioned in Sindh Mining Concession Rules, 2002 and to also observe timelines as agreed between Government and license holder.

The license holders are also required to submit Quarterly reports on exploration license granted and Exploration license can be cancelled on failure to observe timelines as agreed between Government and license holder.

After completing feasibility study the holder of the Exploration License may apply for issuance of Mining Lease in accordance with Sindh Mining Concession Rules 2002.

Government of Sindh offers investment opportunity for Blocks IIIA & B, IV, VII and VIII. Brief Details of blocks are explained Part IV of this information memorandum. Additional detailed geological and other relevant reports/maps can be consulted at SCA library.

Expectation from Applicants at EoI Stage:

The interested companies or consortium should clearly explain the outlines of the proposed project for exploration and exploitation of coal at EoI Stage. The Scope of Work for the investment proposal comprises all activities necessary for the following:

- Express interest for design, plan, develop, finance, insure, own, operate and maintain open cast mines or any other appropriate Mining method with time lines.
- The applicant shall provide following information/documents along with the Project Proposal at EoI Stage:
 - a. Company Profile with verified technical and certified audited reports
 - b. The companies must indicate in order of preference the Block they intend to get allocation within in the offered blocks III A & B, IV, VII, VIII. The allocation of the blocks will be made on the basis of ranking of the proposal and preference.
 - b. Details of the extent of the activities (i.e. projects of different nature) and the quantum of investment that the company is looking to invest under this project along with break-down of how much the company would invest in what activity?

- c. What debt to equity ratio is the company targeting plus what instruments is company looking at to raise the financing for the project both: local and international?
 - d. How the company would raise the total finances for the project and what is the history of raising finances of large scale projects, please include details of credit lines (both funded & non-funded), IPOs, GDRs, Corporate Bonds, private placement or any other capital market product that the company has launched? Do mention how much of these issues were under-written and/or over/under subscribed?
 - e. Provide Credit report or Letter of Support from the company's banks or financial intermediaries
 - f. What other major projects the company is under-taking currently and how was the finance raised?
 - g. In case of Consortium, please provide Consortium Agreement, Technical & Financial Strength of all Consortium Members/ partners with documentary evidence and Commitment of all members/ partners to invest in this project.
 - h. Details of Joint Ventures (JV) if any, along with financial and technological aspects of these JVs.
- Any other scope not included herein but subsequently agreed between sponsors and Government of Sindh
 - **Salient Features of the Bankable Feasibility Study** (to be completed in one year after issuance of Exploration License):
 1. Obtain all necessary permits, licenses, consents and enter into agreements wherever necessary and pay all necessary fees, royalties, local duties
 2. Detailed mining methodology and mine design report including but not limited to geological model, scale of mine & methods, equipment selection, mine scheduling, capital and operating cost etc.
 3. Detailed report on Hydrogeology and Water Management
 4. Detailed report on Geochemical Testing and Geo-technical work to be done during operations
 5. Environmental & Social Impact Assessment as per national and international guidelines. Initiate environment mitigating measures in accordance with the Pakistan Environmental Protection Agency (PEPA) Act, 1997, inter alia, relating to environmental protection, environmental impact and social soundness assessment, and all the requirements of the legislation and environmental guidelines and standards issued under or pursuant to the said Act; details of which can be downloaded from PEPA's official website www.environment.gov.pk World Bank guidelines may also be referred
 6. Re-settlement plan of displaced population in accordance with national and international standards/ guidelines.
 7. Financial Model and credible financing plans for mining project
 8. Mine Closure Plan with refilling the used mines to make it to a cultivatable and habitable grade

9. Linkage with the utilization of coal for power generation or any other viable use

Financing for the Project

The companies should submit credible financing plans for the project including debt /equity financing ratio. At least 25% of the total cost of the project will be through equity.

Performance Guarantee

Submission of Performance Guarantee is mandatory in terms of Mining Concession Rules 2002 Rule 69 (1) *a person shall at the time of the grant of a mineral title, other than a reconnaissance license, lodge with the licensing authority security for compliance with the holder's obligations under these Rules and the title. (2) A security under sub-rule (1) shall be by way of bank guarantee, parent company guarantee or otherwise as may be determined by the licensing authority*

Mining Technology

The companies are expected to propose viable Mining Technology in terms of optimum utilization of resource, supports their investment plans and offers maximum benefit in minimum time and which results in lower costs.

Expected timelines

The companies are expected to provide a firm timeline with three monthly milestone plans. Since these are developed blocks a lot of data is available. Preference will be given to offers which present narrow timelines leading to early completion of BFS and project execution phase.

Milestones

- Signing of MOU with SCA
- Issuance of Exploration License
- Mobilization of Exploration Team/consultant
- Completion of Bankable Feasibility Study
- Issuance of Mining Lease
- Establishment of Site Office
- Selection of Mining/ EPC Contractor
- Finalization of Security Package/Concession agreement
- Financial Closure
- Land acquisition
- Start of Overburden Removal
- Commercial Operations Date

THE PROPOSAL

Who are eligible to submit proposal

Companies &/or consortiums with corporate profile, sound financial position and capacity to progressively commit equity of a minimum US\$ 150 million in the project; possessing the requisite know how and manpower resources with a proven track record of successful execution of similar initiatives; verifiable technical and financial partnership(s) with world renowned mining companies and/ or financial firms are strongly encouraged to apply. Preference will be given to proposals that offer viable project development plans with shortest possible timelines; and those which involve long-term commitment through re-investments and expansions. The Interested Companies are expected to apply for any one of the offered Blocks in response to this ICB.

Facilitation

Government of Sindh will facilitate and access to information to all companies to consult reports and data available with the Government of Sindh including:

- Geological data/ study for Blocks III-A & B, IV, VII & VIII
- Report by John T. Boyd
- United States Geological Survey studies Reports on Blocks.
- Any other available report/data.

In addition, the Government of Sindh will also facilitate and provide governmental support for seeking all approvals and licenses including those for power generation, if required.

Evaluation Criteria

The proposed formula to evaluate the eligible companies' scores is as follows:

Score of respective Company = Financial Strength x 50 % + Technical Strength x 25 % + 'Yes' for Integrated power project 600 MW or CTL/Surface Gasification x 5% + Experience (Power, CTL, Surface Gasification) x 10% + Timeliness x 10%

Financial Strength = The companies with highest Net Worth shall be granted score of 100. Score of all other sponsors shall be reduced from 100 as per their Net Worth against the highest Net Worth. For example three sponsors say sponsor A, B, and C may have Net Worth of US\$ 500 million, 400 million, and 225 million respectively would get the score of 100, 80 (i.e. $400/500 \times 100$), and 45 (i.e. $225 / 500 \times 100$).

Technical Strength = The companies with highest current mining capability in terms of annual coal production in tons shall be granted score of 100. Score of all other sponsors shall be reduced from 100 as per their current annual mining capacity in tons. For example three sponsors say sponsor A, B, and C may have an annual mining capacity of 15 million tons, 35 million tons, and 25 million tons. They would get score of 43, 100, and 71 respectively.

'Yes' for Integrated Power Project or CTL/Surface Gasification = A proposal which integrates the proposal for mining with its use in a power plant of 600 MW capacity or CTL/Surface Gasification, to be financed by the sponsors shall be given preference. Companies not agreeing to an integrated mining-power project would not get any score whereas those agreeing to invest in an integrated project will get full 100 on this count.

Experience of Power Projects = Companies having experience in Power/CTL/Surface Gasification, either in capacity of (i) project investors having more than 20% share in total equity of the project, or (ii) main EPC contractor or (iii) lead O&M contractor would get score for their experience. The company with equivalent production numbers on their credit shall be granted score of 100. Score of all other sponsors shall be reduced relatively from 100 as per their cumulative number of MWs on their credit.

Proposal bond

Companies shall have to provide a Bid Security/Proposal Bond in the form of Bank Guarantee equal to US\$ 10,000. After ranking of proposals all Proposal Bonds, except that of companies of Top Ranked Proposals, shall be returned.

Processing fee

Proposals shall accompany a pay order of PKR 25,000/- as non-refundable processing fee in favor of Sindh Coal Authority.

Selection of Successful Company

Company of the 1st ranked Proposal shall be required to submit within one month a Performance Guarantee for the value of 300,000 US Dollars. The PG shall be in the form of irrevocable bank guarantee or PG from any AAA rated Insurance Company acceptable to Government of Sindh.

The 1st ranked proposal/firm will be invited to sign the MOU with Sindh Coal Authority and before signing MOU, the firm shall furnish the PG valid for the period of completion of BFS. The PG shall be returned on completion of BFS.

For Power generation component the companies shall be required to complete all the formalities of PPIB for issuance of LOI at appropriate stage, as per National Power Policy 2013.

Notice to Proceed

The Proposal Bond of other companies next in rank shall be returned once the PG is received from 1st ranked proposal/firm and MOU is inked. After signing of MOU the successful company shall be issued a Notice to proceed *as* per the agreed time line.

Encashment of PG

Progress of Successful Company shall be monitored by Government of Sindh against the milestones to be agreed in the MOU. If the progress at any time is found to be 30% less than the agreed time lines, the PG in full amount will be en-cashable.

Timelines

As these are developed blocks, exploration license shall be for one year renewable on valid grounds and based on agreed timelines. However, companies are encouraged to submit their own timelines and deadlines earlier than the deadline given herein. The agreed timelines and deadline, in case of successful proposal, shall be made part of MOU and the progress shall be monitored against those milestones and the deadline.

Address for Submission of Proposal

Director General,
Sindh Coal Authority,
Government of Sindh
House No. 16, 'E' Street, Phase V,
(Near Zamzama Park), Defense Housing Authority,
Karachi, Pakistan
Phone: +9221-99251507
Email dg.sca@sindhcoal.gos.pk

Last Date and address for Submission of Proposal

[As per the advertisement]

Proposal Bond (in the form of a Bank Guarantee)
[ON PAKISTAN STAMP PAPER: Mandatory]

Guarantee No. _____

Secretary
Energy Department, Government of Sindh
Karachi

Date of this Guarantee: He
Amount of this Guarantee US\$ 10,000/- (United States Dollars Ten Thousand only)
Validity up to:

THIS GUARANTEE is executed at [---place---] on this [---] day of [--- month ---] 2011 by:

[--- Name of the issuing Bank ---] having its registered office at [---] (hereinafter referred to as the "**Guarantor**", which expression shall mean and include its successors, administrators and legal representatives, whether jointly or severally);

In favor of **Sindh Coal Authority** representing the Government of Sindh in Energy Department, Government of Sindh, Karachi (hereinafter referred to as the "**Beneficiary**", which expression shall mean and include its successors, administrators and legal representatives, whether jointly or severally).

Considering that our client _____ (hereinafter referred to as the "**Investor**", which expression shall mean and include its successors, executors, assigns, administrators and legal representatives whether jointly or severally) is submitting in favor of the Beneficiary a proposal (hereinafter referred to as the "**Proposal**") for a project of developing open cast mines at Thar Block (hereinafter referred to as the "Project") in response to the EOI advertised through print media on Oct 2011 and supplemented by Information Memorandum (the IM) uploaded on website <http://www.sindhcoal.gos.pk/> (hereinafter referred to as the "EOI")

On the request of the Investor, we, the undersigned, responsible delegates and representatives of the Guarantor, and make decisions in its name, declare by this instrument (hereinafter referred as the "**Proposal Bond**"), that the Guarantor do hereby guarantee unconditionally and irrevocably to pay the Beneficiary up to a sum of US\$ 10,000/- (US dollars ten thousand only) in accordance with the following:

1. Immediately upon receipt of the Beneficiary's first written request stating either:
 - that the Investor has withdrawn its Proposal before -----; or
 - that the Investor has willfully misrepresented while submitting the Proposal; or
 - that the Investor has failed to furnish the Processing Fee and the required Performance Guarantee when invited by the Beneficiary to do so, in accordance with the IM;

Notwithstanding any objection of the Investor or of any other party, the Guarantor shall pay to the Beneficiary the above mentioned amount or any other amount(s) the Beneficiary may demand, provided that such amount(s) shall not exceed the above mentioned amount, by any method of payment which is acceptable to the Beneficiary. The decision of the Beneficiary as to the Investor's default, delay or failure in performance listed above shall be final and unquestionable.

- Any payments made to the Beneficiary on its request shall be net and free of and without any present or future deductions such as for the payment of any taxes, executions, duties, expenses, fees, deductions or retentions regardless of the nature thereof or the authority levying the same.

- The Beneficiary may, if and when and in such manner as the Beneficiary in its sole discretion deems appropriate, grant time or other indulgence to or accept or make any composition or arrangement with the Investor and/or vary, renew, discharge, realize, release, enforce or deal with any other securities, guarantees, obligations, decrees, contracts, or agreements, now or hereinafter made or held by the Beneficiary, and such acts shall not affect in any way whatsoever the Beneficiary's rights under this Proposal Bond, and shall not affect in any way whatsoever the Guarantor's liability hereunder, or discharge the Guarantor from its Obligations under this Proposal Bond.
- The Guarantor's obligations as set out in this Proposal Bond shall be continuing obligations and shall not be modified or impaired upon the happening, from time to time, without the Guarantor's assent or otherwise, of any act or omission, or any circumstances or events which would otherwise discharge, impact or otherwise affect any of the Guarantor's obligations contained in this Proposal Bond.
- Demands under this Proposal Bond may be made at any time and from time to time in accordance with its terms.
- No delay or failure to exercise any right or remedy under this Proposal Bond by the Beneficiary shall constitute a waiver of such right or remedy. No single or partial exercise of any right or remedy shall preclude any other or further exercise thereof or of any other right or remedy. No waiver by the Beneficiary shall be valid unless made in writing.
- No set-off, counter claim, reduction, or diminution of any obligation that the Guarantor has or may have against the Beneficiary shall be available to it against the Beneficiary in connection with any of its obligations to the Beneficiary under this Proposal Bond. The Guarantor shall make all payments under this Proposal Bond in United States Dollars and in full, without set-off or counterclaim and free and clear of any deductions or withholdings in immediately available, freely transferable, cleared funds for value on the due date to the Beneficiary, provided that if the Guarantor is required to make any deduction or withholding from such payments under applicable law, it shall pay to the Beneficiary such additional amount necessary to ensure that the Beneficiary receives an amount equal to the amount which it would have received had no such deduction or withholding been made.
- The Guarantor hereby declares and confirms that under its constitution and applicable laws and regulations, it has the necessary power and authority, and all necessary authorizations, approvals and consents there under to enter into, execute, deliver and perform the obligations it has undertaken under this Proposal Bond, which obligations are valid and legally binding on and enforceable against the Guarantor under the Laws of Pakistan. Further, that the signatory(ies) to this Proposal Bond are the Guarantor's duly authorized officers.
- This Proposal Bond shall be governed by the laws of Pakistan, and shall come into full force immediately upon submission and shall continue in full force and effect until the official closing of the counters of the Guarantor [name of Branch] on =====2012 (the "**Expiry Date**").
- The Guarantor's maximum liability under this Proposal Bond is limited to the sum of US\$ 10000/- (US Dollars ten thousand only). This Proposal Bond shall expire at the official closing of the counters of the Guarantor, [*name of the Branch*] [*city*], on the Expiry Date. The Guarantor's obligation under this Proposal Bond is limited to payment of claims lodged in writing and presented at the counters of the Guarantor, [*name of the Branch*] [*city*], on or before the Expiry Date, following which date, subject to any liability for claims presented on or before the Expiry Date, the Guarantor shall stand fully discharged and released from any and all obligations, claims and liabilities under this Proposal Bond whether or not this Proposal Bond is returned to the Guarantor.

- This Proposal Bond is the full and complete understanding between the Guarantor and the Beneficiary in relation to the matters contained herein, and this undertaking of the Guarantor shall not be modified, amended, or amplified in any way by reference to any document, understanding, instrument or agreement referred to therein, and any such reference shall not be deemed to incorporate by reference any document, understanding, instrument or agreement.
- We hereby engage with you that the demand raised by the Beneficiary under this Proposal Bond shall meet with due honor upon presentation.

For and on behalf of the Guarantor:

[To be signed by the authorized signatory(ies) of the Bank,
Dated and Stamped with the Bank's Stamp]

[Also to be witnessed by two adult male witnesses, specifying in each case, the full name,
Computerized National Identity Card # and address]