



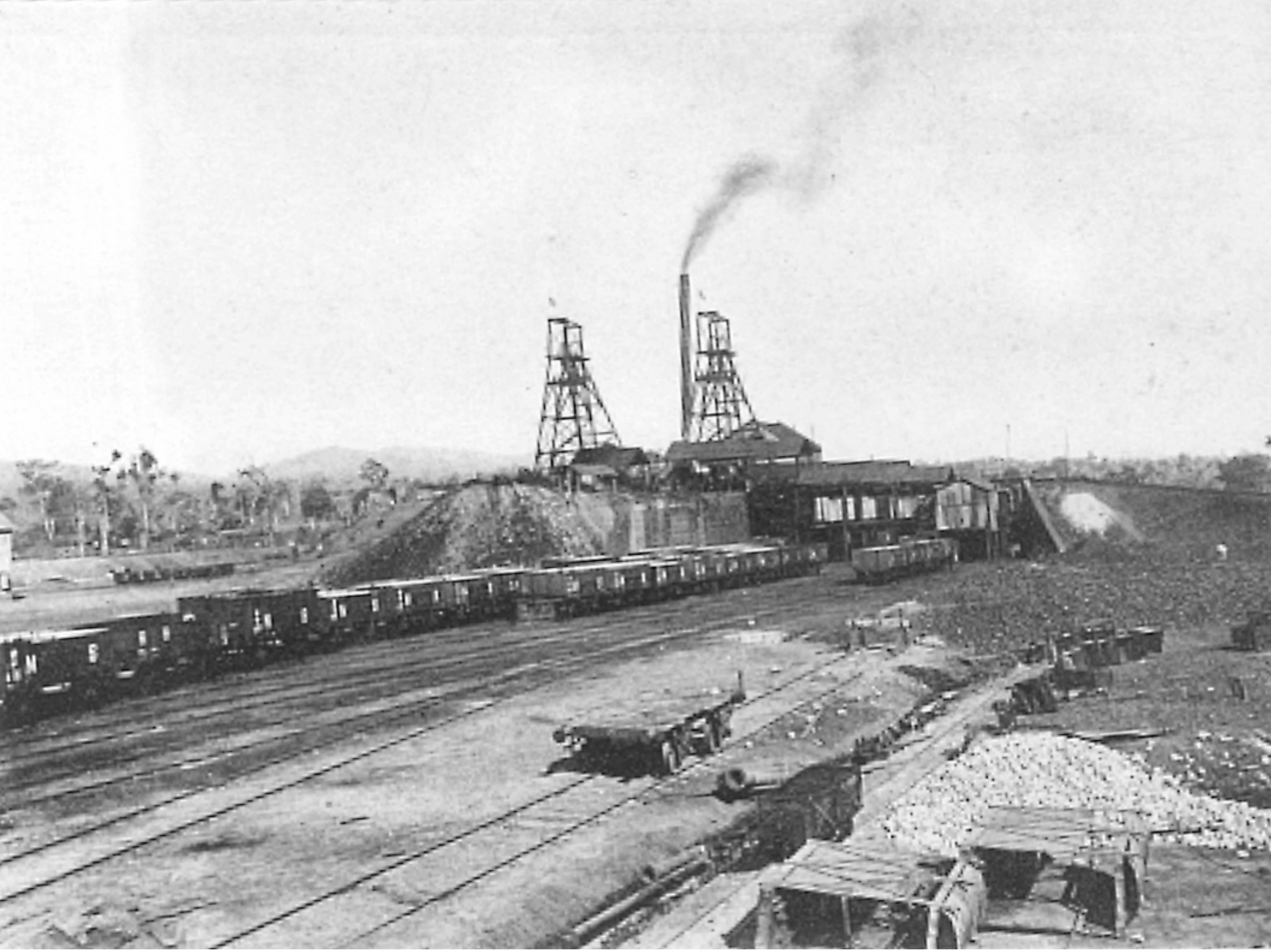
The Singareni Collieries Company Limited  
(A Government Company)

**PRESENTATION  
ON  
EXTRACITON OF STEEP SEAMS**

Date : 4<sup>th</sup> April, 06  
Time : 4.55 – 5.00 PM  
Venue : Taj Palace Hotel  
S.P. Marg  
New Delhi

# Singareni

- Singareni is mining coal from 1889
- Named as Singareni Collieries Co. Ltd. from 23<sup>rd</sup> December, 1920.
- The Nizam of Hyderabad purchased shares of Singareni in 1945 and it became a Government company from 1945.
- From 1960, the Gol participated with 49% shares.



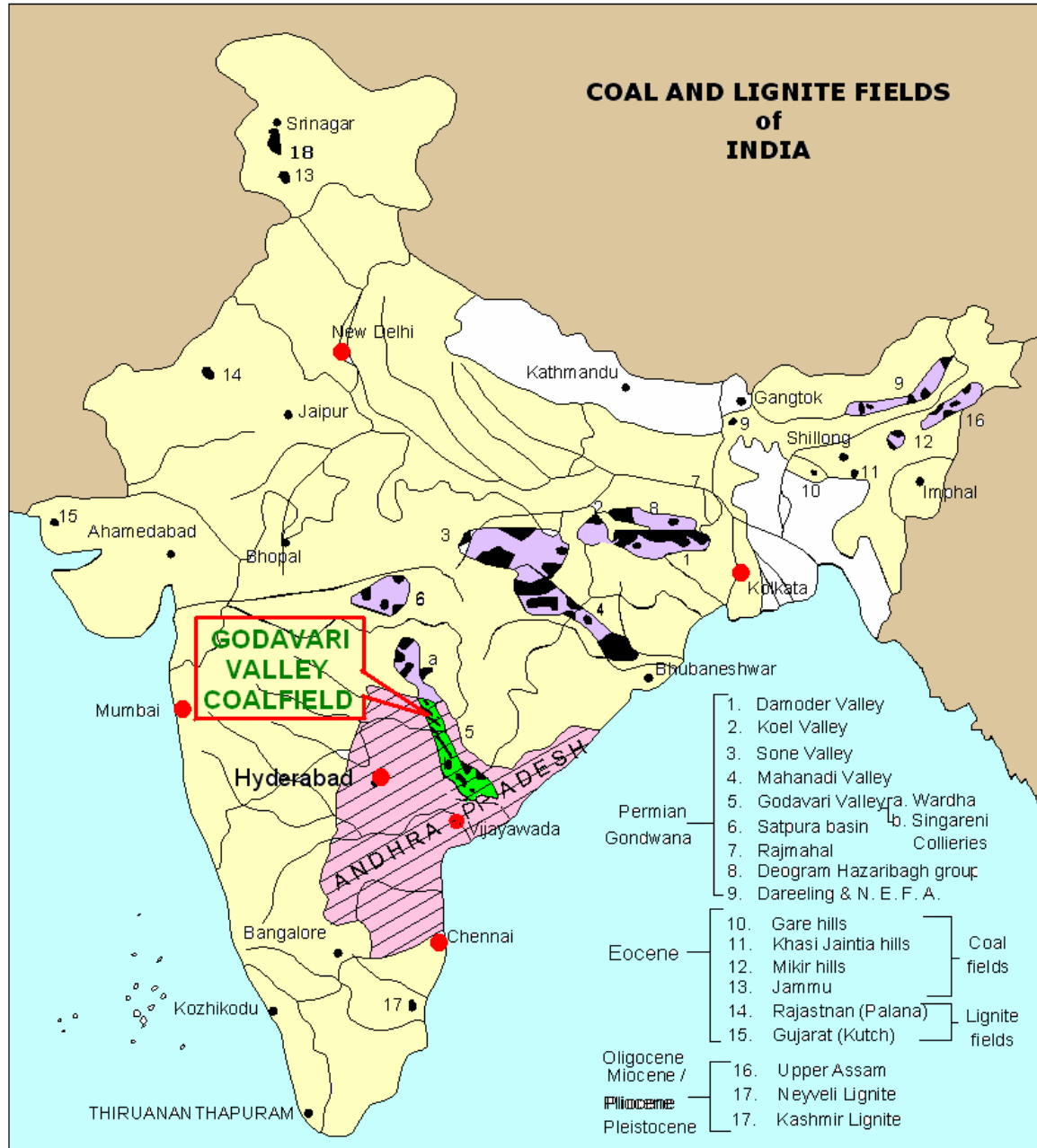
# GEOLOGY

- In 1872-88, Sir William King has completed the mapping of entire Coalfield and sub-divided the Gondwana rocks into Lower and Upper Gondwana.
- The Lower Gondwana consists of Talchir, Barakar and Kamthi series and Upper Gondwana are classified into Maleri, Kota and Chikiala formations.
- The coastal Upper Gondwana rocks are divided into Gollapalli sandstones, Raghavapuram shales and Tirupati sandstones.

# Location

- Godavari Valley Coalfields spread out over 350 Sq.Kms.
- Mines located in Adilabad, Karimnagar, Warangal and Khammam Distritcs.
- Northern most is Dorli, Adilabad Dist. (30 Kms East of Asifabad) and Southern most is Sattupalli, Khammam Dist.

## COAL AND LIGNITE FIELDS of INDIA

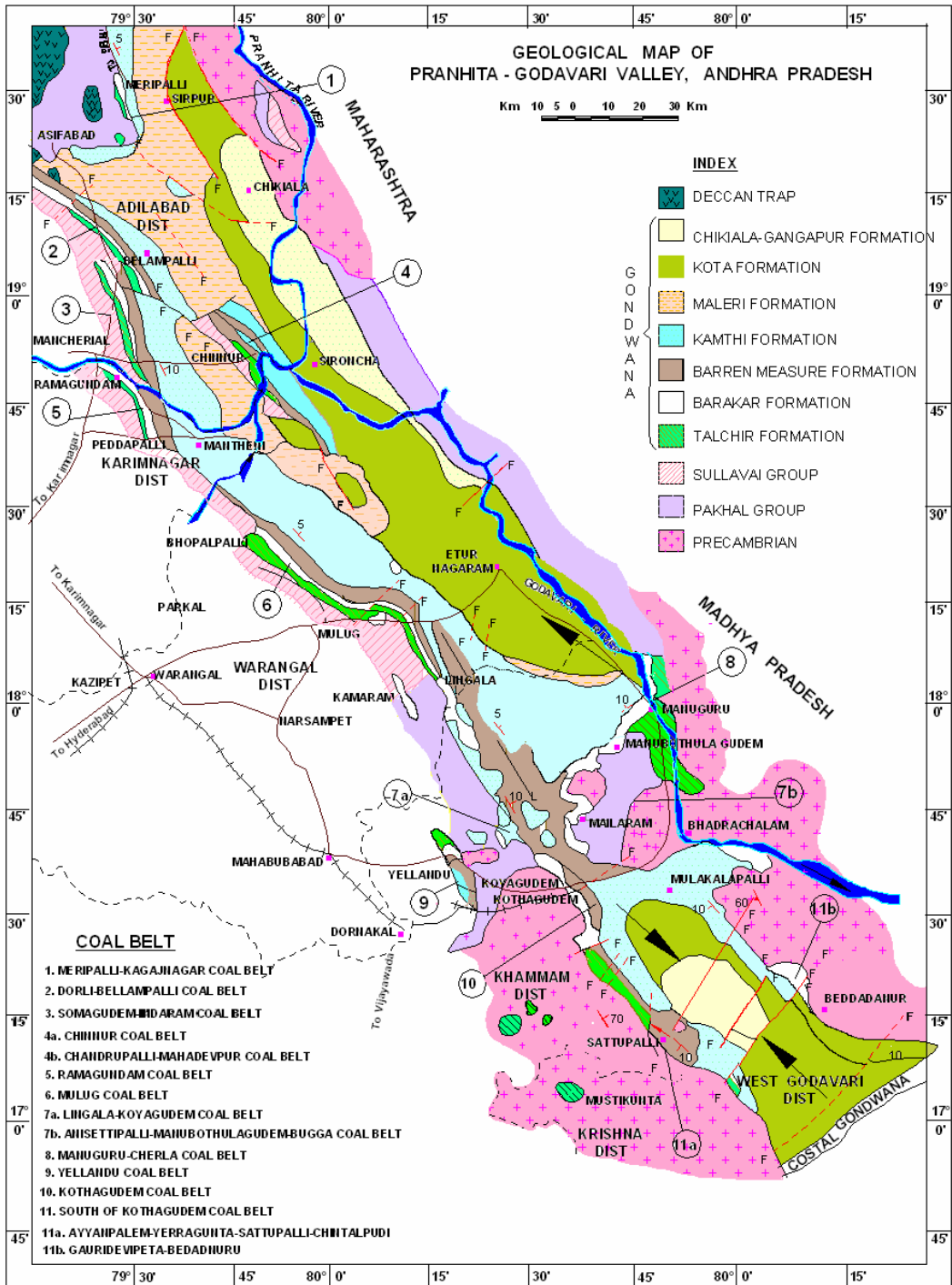


# GEOLOGICAL MAP OF PRANHITA - GODAVARI VALLEY, ANDHRA PRADESH

Km 10 5 0 10 20 30 Km

## INDEX

- DECCAN TRAP
- CHIKIALA-GANGAPUR FORMATION
- KOTA FORMATION
- MALERI FORMATION
- KAMTHI FORMATION
- BARREN MEASURE FORMATION
- BARAKAR FORMATION
- TALCHIR FORMATION
- SULLAVAI GROUP
- PAKHAL GROUP
- PRECAMBRIAN



## COAL BELT

1. MERIPALLI-KAGAJIAGAR COAL BELT
2. DORLI-BELLAMPALLI COAL BELT
3. SOMAGUDEM-MIDARAM COAL BELT
- 4a. CHINUR COAL BELT
- 4b. CHAUDRUPALLI-MAHADEVPUR COAL BELT
5. RAMAGUDDAM COAL BELT
6. MULUG COAL BELT
- 7a. LIINGALA-KOYAGUDEM COAL BELT
- 7b. ANISETTIPALLI-MANUBOTHULAGUDEMBUGGA COAL BELT
8. MAHUGURU-CHERLA COAL BELT
9. YELLAIDU COAL BELT
10. KOTHAGUDEM COAL BELT
11. SOUTH OF KOTHAGUDEM COAL BELT
- 11a. AYYANPALEM-YERRAGUNTA-SATTUPALLI-CHINTALPUDI
- 11b. GAURIDEVIPETA-BEDADIURU

# GEOLOGICAL RESERVES

**ANDHRA PRADESH**  
**GODAVARI VALLEY COALFIELD**

AS PER GSI INVENTORY- AS ON 01-01-2006

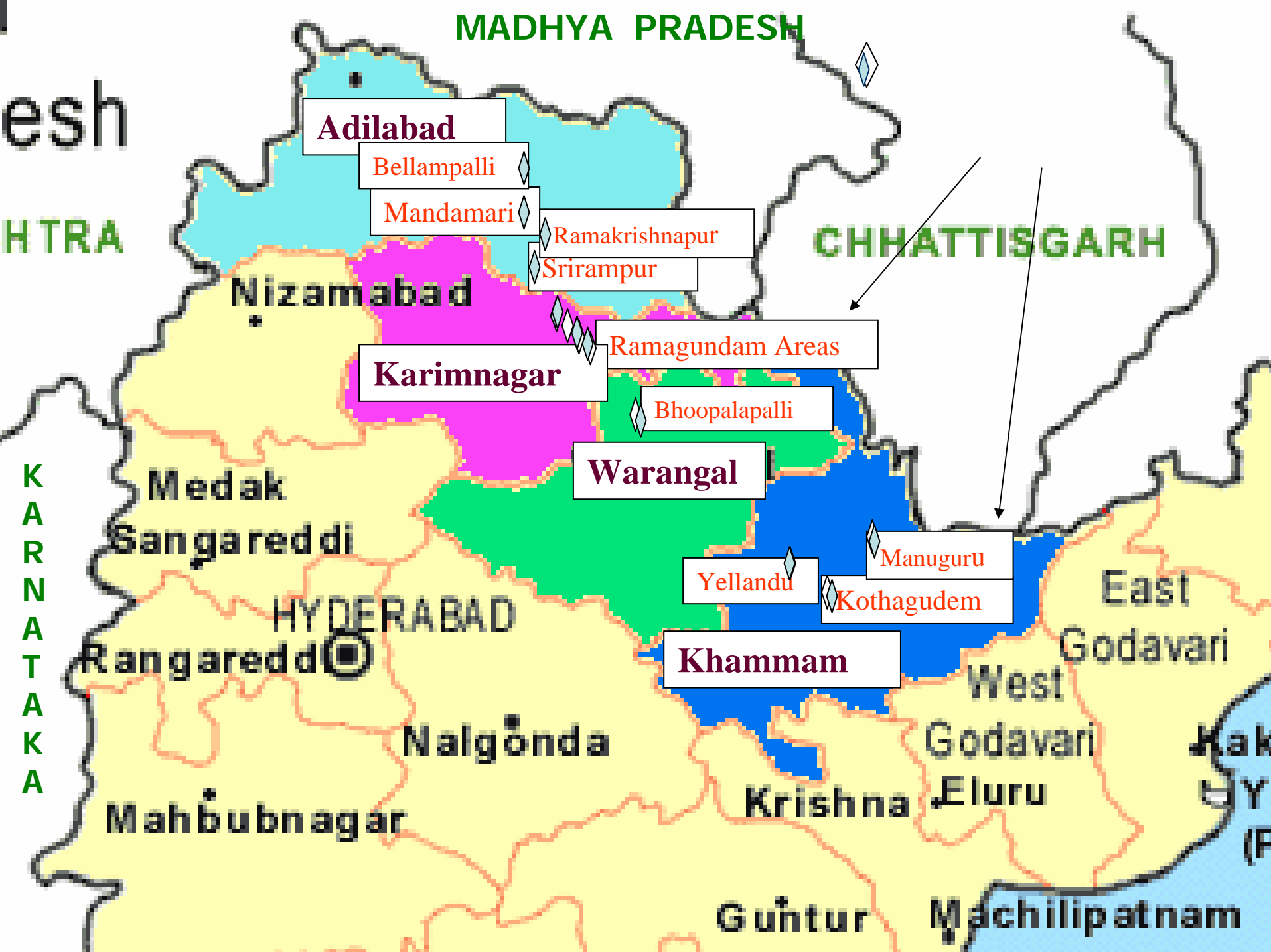
NON-COKING COAL – GEOLOGICAL RESERVES (in million tonnes)

<b>DEPTH RANGE</b>	<b>PROVED</b>	<b>INDICATED</b>	<b>INFERRED</b>	<b>TOTAL</b>
<b>0-300m</b>	5505.49	2239.12	102.25	7846.86
<b>300-600m</b>	2897.69	2900.71	553.05	6351.45
<b>600-1200m</b>	0.00	1018.34	1928.95	2947.29
<b>TOTAL</b>	<b>8403.18</b>	<b>6158.17</b>	<b>2584.25</b>	<b>17145.60</b>



# .....About GVCF

- There are Seven Co relatable seams in Godavari valley coal fields
- The seams are flatter in Khammam district and the gradient increases from Karimnagar to Adilabad district.
- The seams of Warangal district are steepest in the GVCF with gradient ranging from 1 in 2.5 to 1 in 3.5 ( $23^{\circ}$  to  $17^{\circ}$ ).



esh

HTRA

MADHYA PRADESH

CHHATTISGARH

Nizamabad

Adilabad

Bellampalli

Mandamari

Ramakrishnapur

Srirampur

Karimnagar

Ramagundam Areas

Bhoopalapalli

Warangal

Medak

Sangareddi

Yellandu

Manuguru

Kothagudem

HYDERABAD

Khammam

East Godavari

Rangareddi

West Godavari

Nalgonda

Godavari

Mahabubnagar

Krishna

Eluru

Guntur

Machilipatnam

KARNATAKA

## Inclination defined –

- There are various nomenclature and various Techno-colloquial words such as flat, slightly inclined, inclined, steeply inclined and very steeply inclined depending on the perception of company.
- As per SCCL perception generally the following is generally understood:

**1 in 6 ( $10^\circ$ ) & flatter**

**1 in 6 to 1 in 4.0 ( $10^\circ$  to  $15^\circ$ )**

**1 in 5.5 to 1 in 4.5 ( $11^\circ$  to  $13^\circ$ )**

**1 in 4.5 ( $13^\circ$ ) & steeper**

**Flat seam**

**Slightly inclined**

**Inclined**

**Steeply Inclined**

# Gradient wise details of reserves

Million Tonnes

<b>GRADIENT WISE GEOLOGICAL RESERVES OF GVCF</b>			
<b>REGION</b>	<b>Steeper than 1 in 6(10°)</b>	<b>Flatter than 1 in 6(10°)</b>	<b>TOTAL</b>
<b>BPA</b>	<b>2945.33</b>	<b>133</b>	<b>3078.33</b>
<b>RGM</b>	<b>2455.33</b>	<b>286.58</b>	<b>2741.91</b>
<b>KGM</b>	<b>1650.44</b>	<b>933.36</b>	<b>2583.8</b>
	<b>7051.1</b>	<b>1352.94</b>	<b>8404.04</b>
BHPL AREA IS	745		

# General Mining methods

- Two methods;
  - Opencast
  - Underground.
- When the cost of Overburden removal to expose the coal is economical, opencast mining is adopted.
- Technology used in underground mining depends on geology and geometry of the seam.

- Smaller deposits can have Manual loading and intermediate technologies with continuous miners or LHDs and SDLs – Bord and Pillar method.
- Large reserve and uniform deposit are mined by Longwall mining – a bulk production but capital intensive technology.

- Mechanisation in Bord and pillar has limitations of gradients. Seams steeper than  $12^\circ$  (1 in 5 ) are not suitable - leaving little possibility to mechanise most of the mines with these deposits.

# Existing technologies

## A) TECHNOLOGIES IN OPEN CAST PROJECTS :

1. SHOVEL-DUMPER
2. SURFACE MINER
3. DRAGLINE
4. HIGH WALL MINING
5. PUNCH LONGWALL

## B) SEMI MECHANISATION

1. SDLs
2. LHDs
3. CONTINUOUS MINER



## C) LONGWALL MECHANIZATION

1. CONTINUATION IN THE EXISTING MINES.
2. INTRODUCTION IN NEW MINES

# TECHNICAL CONSIDERATIONS

**Based on gradient of the seam :**

- Manual Loading** – In all gradients
- SDL mechanization** – Where the gradient is 1 in 5 ( $12^\circ$ ) & flatter
- LHD mechanization** – Where the gradient is 1 in 6 ( $10^\circ$ ) & flatter
- Continuous Miner** – Where the gradient is 1 in 8 ( $7^\circ$ ) & flatter
- Longwall** – Where the property is devoid of faults

## Limitations in adoptable technologies

- Reserves amenable for Opencast mining at SCCL are limited.
- Steep gradients in underground mines rendering mechanization difficult.
- Poor roof condition needing extra care like stitching, roof bolting etc., on continuous basis.
- Clay bands, hard coal and poor grades in upper seams.

## SCCL efforts .....

- Continue Opencast mining in existing mines and propose projects wherever technically feasible and economically viable.
- Adopt Semi-mechanization in mines where it is technically feasible- to enhance Safety & Productivity.
- Introduce Longwall technology for bulk production.

Still the problem remains with about 21 mines where it is forced on SCCL to continue manual mining due inclination of seams.



*FEEL OF INCLINED SEAM*

## The situation.....

- SCCL is having limited Opencastable reserves.
- Most of SCCL reserves are deep seated located at a depth range of 250 mts to 600 mts.
- Most of the deposits are steeply inclined where intermediate technology cannot be implemented.
- The future projects are also envisaged in steeply inclined seams

# Gradient wise details existing underground mines

SI No	Inclination	No of existing Under ground mines	Percentage
1	1 in 6 ( $10^{\circ}$ ). & flatter	11	22
2	1 in 6 to 1 in 5.5 ( $10^{\circ}$ to $11^{\circ}$ )	3	6
3	1 in 5.5 to 1 in 4.5 ( $11^{\circ}$ to $13^{\circ}$ )	4	8
4	1 in 4.5 & steeper ( $13^{\circ}$ )	33	65
	<b>Total</b>	<b>51</b>	<b>100</b>

- With the introduction of semi mechanization was completed in all mines which are flat or slightly inclined with introduction of about 95 SDLS and 37 LHDs.

# The challenge-1

- Problem still remains with introduction of mechanization in inclined & steeply inclined seams in about 21 mines where it is not possible to introduce semi mechanization in SCCL.

Manual method of mining needs to be continued in these underground mines unless technically feasible mechanized methods of mining adopted

- In these mines considerable reserves are locked up in form of developed pillars which are to be extracted.
- Adoptable technologies are to be developed to suit the requirement.

*The likely method could be extraction of pillars by Longwall*



## The challenge-2

- For sustained production SCCL has to produce at least 3 million tonnes from mega underground projects in these Inclined seams.
- All most all the projects envisaged for future projects are for extraction of deposits steeper than 1 in 7( $8^{\circ}$ ).
- The new projects proposed for Bhoopalpalli area are steepest of all with 1 in 2.5 to 1 in 3.5 gradient ( $23^{\circ}$  to  $17^{\circ}$ ).

*The likely method could be  
Working of Longwall in steep seams*

# The Need....

- **Introduction of semi-mechanization / Mechanization to phase out Manual mining.**

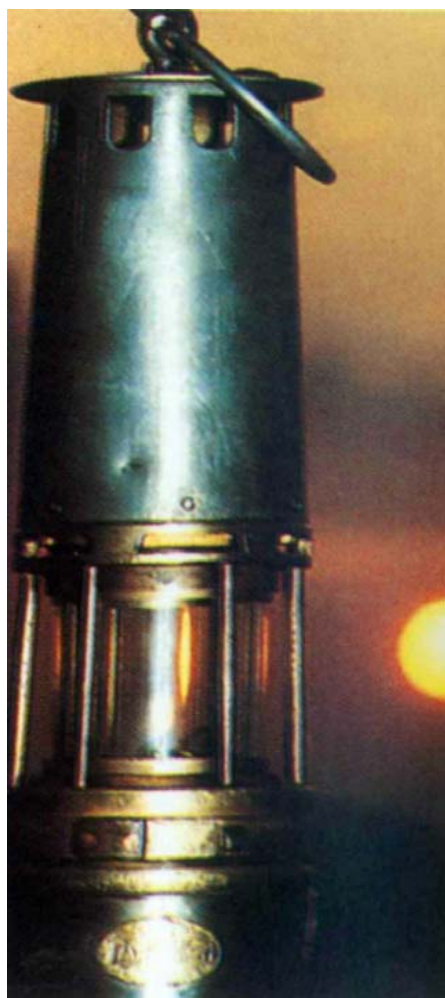
*Foreign participation is required for bringing out some adoptable technology in these mines to phase out manual loading*

- **SCCL proposes to venture Longwall mining in these inclined seams.**

*Participation of foreign companies is a must as in house experience is too limited in the field of Longwall mining in inclined seams.*

## Hence the areas of cooperation....

- Seek bilateral technical co-operation for working steep deposits....
  - Semi mechanization in extraction of standing pillars.
  - Extraction of pillars by Longwall in steep seams.
  - Extraction of steep seams by Longwall in virgin property.



**Thank you all,**

