

PRICE ESCALATION VERIFICATION PROJECT

CONSULTANTS' REPORT

**Economic Research Unit,
Indian Statistical Institute**

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Executive Summary

At the request of Coal India Limited (CIL) the “Price Escalation Verification Project” has been undertaken by a team of the Economic Research Unit, Indian Statistical Institute. The project examines the escalation clause associated with the price index formula to be used in contract agreements between CIL and Mine Developers.

The existing formulae for price escalation, both for open cast and underground coal mining, have been examined and certain modifications along with justification have been proposed. Using illustrative examples, it is found that the suggested escalation formulae have significant impact on the final prices.

Table of Contents

1. Introduction	4
1.1 Price variation clauses vis-à-vis conventional practices.....	4
1.2 Structure of the Report.....	5
2. Proposed Escalation formula for underground coal mining.....	6
2.1 Proposed Formula.....	6
2.2 An illustration of the procedure specified under Section 2.1.....	7
2.3 Justification for price indices suggested under Section 2.1.....	8
2.4 Proposed Change in Re-Handling Charges.....	8
2.5 Illustration of Escalation of Price Indices for long duration.....	8
3. Proposed Escalation formula for open-cast coal mining	9
3.1 Proposed Formula.....	9
3.2 An illustration of the procedure specified under Section 3.1.....	10
3.3 Justification for weights suggested under Section 3.1.....	11
3.4 Justification for price indices suggested under Section 3.1.....	11
3.5 Proposed Change in Re-Handling Charges.....	11
3.6 Illustration of Escalation of Price Indices for long duration.....	12
4. Conclusion.....	13
Appendix 1: Data Source and List of Items under Wholesale Price Indices (WPI).....	14
Appendix 2: Statement Showing Break-up of Cost Elements in the Cost of Production....	23

1 Introduction

The scope of this work is to

- (i) Examine the various formulae associated with various indices such as the Wholesale Price Indices (WPI), the Consumer Price Indices for Industrial Workers (CPI(IW)) used in the Model Contract Agreement (MCA); and
- (ii) Verify the price escalation clauses vis-à-vis conventional practices.

In this project the existing formulae for price escalation, both for open cast and underground coal mining, have been examined and certain modifications along with justification have been proposed.

1.1 Price variation clauses vis-à-vis conventional practices

The conventional practice for price variations clause in different contract manuals of CIL, in force, are as under:

Price variation for Labour:

Revision in minimum wages for unskilled workers payable as per the Minimum Wages Act / Rules of the State or Central Government, whichever is more, applicable to the place of work as on the last date stipulated for receipt of the Price bids or Revised Price bids whichever is later.

Price variation for material:

Revision in average All India Wholesale Price Index for all commodities for the period to which price variation relates as published by the RBI Bulletin, Ministry of Industry & Commerce, Govt. of India.

Price variation for POL:

Revision in average Index Number for Wholesale Price for the group of fuel, power, light and lubricants as published by Economic Ministry of Industry, Govt. of India prevalent on the last date of receipt of price bids whichever is later.

The different components under different heads, as suggested in the CIL manuals, is given in the following table:

Sl. No	Particulars	A (Labour component)	B (Material component)	C (POL component)
1	For Building works	25	75	NIL
2	For Road works	15	80	05
3	For external sewerage, external water supply and external electrification	10	90	NIL
4	For external water supply, external sanitary and external electrification (Through labour rate contract)	75	25	NIL
5	For steel structural works	15	85	NIL
6	For steel structural works with Department free supply of rolled steel sections (Through labour rate contract)	75	25	NIL
7	Coal Handling Plant Civil works	25	75	NIL
8	For underground civil works such as Incline Drivage, Shaft Sinking etc.	35	65	NIL
9	For Erection and Commissioning of P&M	65	35	NIL

For all other works not listed above, the component of labour, material and POL of the total cost of work shall be as specifically indicated in the tender document.

1.2 Structure of the Report:

Section 2 proposes the escalation formula for underground coal mining and provides illustrative examples under the existing and revised formulae; Section 3 proposes the escalation formula for open cast coal mining and provides an illustrative example under the existing and revised formulae; and finally, Section 4 concludes the report. There are 2 Appendices: Appendix 1 presents

the data source and list of items under Wholesale Price Indices (WPI) and Appendix 2 presents the Statement Showing Break-up of Cost Elements in the Cost of Production.

2: Proposed Escalation formula for underground coal mining

2.1. Proposed Formula

For underground coal mining, it is recommended that the Base Mining Charge be revised every quarter (commencing from the first quarter after the Bid Date) according to the percentage derived from the following formula:

- (a) [25% (twenty-five per cent)] of the component will be fixed and will not be subjected to any escalation whatsoever, plus
- (b) [35% (thirty-five per cent)] of the percentage change in the Wholesale Price Index published by the Ministry of Industry, Government of India, for the category “Mining/ Quarrying/ Metallurgical Machinery/ Parts”;¹ plus
- (c) [30% (thirty per cent)] of the percentage change in the Consumer Price Index for Industrial Workers, published by the Labour Bureau, Government of India; plus
- (d) [10% (ten per cent)] of WPI of applicable electricity (Industry) tariff (Rupees per kilo watt hour);

where the percentage change refers to that between the Reference Index Dates (as defined on p. 143 of the Model Contract Agreement for Underground Coal Mining) of the quarter immediately preceding the Bid Date and the quarter immediately preceding the date of revision.

¹ Please see Appendix 1 for a list of categories for which the monthly Wholesale Price Index is available.

2.2. An illustration of the procedure specified under Section 2.1

Table 1

Category	Sept. 2015	Sept. 2016	Inflation rate	Existing Weight	Proposed Weight
Fixed Rate	-	-	-	0.25	0.25
WPI (all commodities)	176.5	182.8	3.57%	0.35	-
WPI (Mining/ Quarrying/ Metallurgical Machinery/ Parts)	153.2	153.2	0.00%	---	0.35
CPI (IW) – India (2001=100)	266	277	4.14%	0.30	0.30
WPI of Electricity (Industry) Tariff (Rs. per Kwh)	151.3	155.7	2.91%	0.10	0.10
				1.00	1.00

Note: WPI: (2004-5=100)

Table 1 above provides inflation rates for relevant price indices between Sept. 2016 and Sept. 2015, expressed as a percentage of the index value in Sept. 2015. Using Table 1, and assuming that a bid is submitted and accepted on 1st October 2015 with a Base Mining Charge of Rs.100 for an **underground** mine, the Base Mining Charge for the quarter beginning 1st October 2016, according to the formula provided on p. 141-142 of the Model Contract Agreement for Underground Coal Mining should be:

$$C_O = (35\% \text{ of } 3.57\% + 30\% \text{ of } 4.14\% + 10\% \text{ of } 2.91\% + 100\%) (100) = (2.78\% + 100\%) (100).$$

Thus, the Base Mining Charge would rise by **2.78%** over the bid charge. The Base Mining Charge according to our suggested revised formula, as under 2.1, is:

$$C_R = (35\% \text{ of } 0\% + 30\% \text{ of } 4.14\% + 10\% \text{ of } 2.91\% + 100\%) (100) = (1.53\% + 100\%) (100).$$

Thus, in this example, the suggested revised formula implies a **1.53%** increase in the Base Mining Charge, as opposed to the 2.78% implied by the original formula. In other words, for this example,

our revised formula generates only **about half (55%)** of the increase in the Base Mining Charge that is implied by the original formula.

2.3. Justification for price indices suggested under Section 2.1.

The sub-categories of price indices suggested appear to be the ones which provide the closest approximation of the actual cost increase faced by the Mine Operator, and avoid inclusion of unrelated items (which may be subject to high inflation rate, e.g., ‘Food’) and double-counting to the maximum possible extent. That use of these price indices has significant impact is illustrated by the example under 2.2., which implies an increase in the Base Mining Charge which is about half of that implied by the original formula.

2.4 Proposed Change in Re-Handling Charges:

The proposed weights of price indices for revising the Base Re-Handling charge is:

25% for CPI(IW), 40% for WPI of “High Speed Diesel” and 35% for WPI of “Mining/ Quarrying/ Metallurgical Machinery/ Parts”.

2.5 Illustration of Escalation of Price Indices for long duration (5 and 10 years)

Table 2

Category	Sept. 2006	Sept. 2011	Sept. 2016	Inflation rate per year (2006-2016)	Inflation rate per year (2011-2016)	Inflation rate per year (2006-2011)
WPI (all commodities)	112.2	156.2	182.8	6.29%	3.41%	7.84%
WPI (Mining/ Quarrying/ Metallurgical Machinery/ Parts)	129.2	147.5	153.2	1.86%	0.77%	2.83%
CPI (IW) – India (2001=100)	125	197	277	12.16%	8.12%	11.52%
WPI of Electricity (Industry) Tariff (Rs. per Kwh)	104.2	104.6	155.7	4.94%	9.77%	0.08%

Note: WPI: (2004-5=100)

Table 3

Overall Escalation per year	Existing Formula	Proposed Formula
Sept. 2006-Sept.2016 (10 yrs.)	6.34%	4.79%
Sept. 2011-Sept.2016 (5 yrs.)	4.61%	3.68%
Sept. 2006-Sept.2011 (5 yrs.)	6.21%	4.46%

Section 3. Proposed Escalation formula for open-cast coal mining

3.1. Proposed Formula

For open cast coal mining, it is recommended that the Base Mining Charge be revised every quarter (commencing from the first quarter after the Bid Date) according to the percentage derived from the following formula:

- (a) [20% (twenty per cent)] of the component will be fixed and will not be subjected to any escalation whatsoever, plus
- (b) [25% (twenty-five per cent)] of the percentage change in the Wholesale Price Index for the category “Mining/ Quarrying/ Metallurgical Machinery/ Parts”; plus
- (c) [5% (five per cent)] of the percentage change in the Wholesale Price Index for the sub-category “Lubricants”, plus
- (d) [25% (twenty-five per cent)] of the percentage change in the Consumer Price Index for Industrial Workers; plus
- (e) [25% (twenty-five per cent)] of the percentage change in the Wholesale Price Index for the sub-category “high speed diesel oil”,

where the percentage change refers to that between the Reference Index Dates (as defined on p. 142 of the Model Contract Agreement for Coal Mining) of the quarter immediately preceding the Bid Date and the quarter immediately preceding the date of revision.

3.2. An illustration of the procedure specified under Section 3.1.

Table 4

Category	Sept. 2015	Sept. 2016	Inflation rate	Existing Weight	Proposed Weight
Fixed Rate	-	-	-	0.20	0.20
WPI (all commodities)	176.5	182.8	3.57%	0.25	-
WPI (Mining/ Quarrying/ Metallurgical Machinery/ Parts)	153.2	153.2	0.00%	---	0.25
WPI (Lubricants)	277.5	277.5	0.00%	---	0.05
CPI (IW) – India (2001=100)	266	277	4.14%	0.25	0.25
WPI (High Speed Diesel)	174	207.2	19.08%	0.30	0.25
				1.00	1.00

Note: WPI: (2004-5=100)

Using Table 4, and assuming a bid is submitted and accepted on 1st October 2015 with a Base Mining Charge of Rs 100 for an **open cast mine**, the Base Mining Charge for the quarter beginning 1st October 2016, according to the formula provided on p. 141 of the Model Contract Agreement for Coal Mining should be:

$$C_O = (25\% \text{ of } 3.57\% + 25\% \text{ of } 4.14\% + 30\% \text{ of } 19.08\% + 100\%) (100) = (7.65\% + 100\%) (100).$$

Thus, the original formula implies a **7.65%** increase in the Base Mining Charge. The Base Mining Charge according to our suggested revised formula, as under 3.1, is:

$$C_R = (25\% \text{ of } 0.0\% + 5\% \text{ of } 0.0\% + 25\% \text{ of } 4.14\% + 25\% \text{ of } 19.08\% + 100\%) (100) \\ = (5.80\% + 100\%) (100).$$

Thus, our proposed revised formula, as under 3.1., yields a **5.80%** increase. In other words, for this example, our revised formula generates only **76%** of the increase in the Base Mining Charge that is implied by the original formula.

3.3. Justification for weights suggested under Section 3.1.

Appendix 4 provides a statement showing tentative break-up of cost elements in the cost of production, as received from Coal India. The statement shows that diesel oil constitutes at most 24% of total cost for open cast mines, we are recommending that 25% of the inflation in the Base Mining Charge be directly linked to the inflation rate specifically for the wholesale price index for high speed diesel oil. Approximately 5-6% of the total cost is shown to be constituted by lubricants. Hence we suggest a 5% weight on this category.

3.4. Justification for price indices suggested under Section 3.1.

The sub-categories of price indices suggested appear the ones which provide the closest approximation of the actual cost increase faced by the Mine Operator, and avoid inclusion of unrelated items (which may be subject to high inflation rate, e.g., 'Food') and double-counting to the maximum possible extent. The use of these price indices is likely to have significant impact, as is illustrated by the example under 3.2., which implies an increase in the Base Mining Charge which is about three fourths of that implied by the original formula.

3.5 Proposed Change in Re-Handling Charges:

The proposed weights of price indices for revising the Base Re-Handling charge is:

25% for CPI(IW), 40% for WPI of "High Speed Diesel" and 35% for WPI of "Mining/ Quarrying/ Metallurgical Machinery/ Parts".

3.6 Illustration of Escalation of Price Indices for long duration (5 and 10 years)

Table 5

Category	Sept. 2006	Sept. 2011	Sept. 2016	Inflation rate per year (2006-2016)	Inflation rate per year (2011-2016)	Inflation rate per year (2006-2011)
WPI (all commodities)	112.2	156.2	182.8	6.29%	3.41%	7.84%
WPI (Mining/ Quarrying/ Metallurgical Machinery/ Parts)	129.2	147.5	153.2	1.86%	0.77%	2.83%
WPI (Lubricants)	128.2	236.6	277.5	11.65%	3.46%	16.91%
CPI (IW) – India (2001=100)	125	197	277	12.16%	8.12%	11.52%
WPI (High Speed Diesel)	133.7	167.8	207.2	5.50%	4.70%	5.10%

Note: WPI: (2004-5=100)

Table 6

Overall Escalation per year	Existing Formula	Proposed Formula
Sept. 2006-Sept.2016 (10 yrs.)	6.26%	5.46%
Sept. 2011-Sept.2016 (5 yrs.)	4.29%	3.57%
Sept. 2006-Sept.2011 (5 yrs.)	6.37%	5.71%

4. Conclusion

The project titled 'Price Escalation Verification Project' examines the escalation clause associated with price index formulae used in the contract agreements between the CIL and Mine Developers. The present study has suggested revising the escalation clause, and accordingly modified the escalation rule based on reasonable weights and indices for both underground and open-cast coal mining. The current expenditure shares of different categories are chosen as weights. The revised formulae provide the closest approximation of the actual cost increase faced by Mine Operators and minimize double or multiple counting problems.

Appendix 1

Wholesale Prices Data Source: <http://www.eaindustry.nic.in/home.asp>

List of Items

COMM NAME	Poultry Chicken
ALL COMMODITIES	Pork
I PRIMARY ARTICLES	e. CONDIMENTS & SPICES
(A) FOOD ARTICLES	Black Pepper
a. FOOD GRAINS(CEREALS+PULSES)	Chillies(Dry)
a1. CEREALS	Turmeric
Rice	Cardamom
Wheat	Ginger(Dry)
Jowar	Betelnut/Arecanut
Bajra	Cummin
Maize	Garlic
Barley	Corriander
Ragi	f. OTHER FOOD ARTICLES
a2. PULSES	Tea
Gram	Coffee
Arhar	(B) NON-FOOD ARTICLES
Moong	a. FIBRES
Masur	Raw Cotton
Urad	Raw Jute
b. FRUITS & VEGETABLES	Mesta
b1. VEGETABLES	Raw Wool
Potato	Raw Silk
Sweet Potato	Coir Fibre
Onion	b. OIL SEEDS
Tapioca	Groundnut Seed
Ginger(Fresh)	Rape & Mustard Seed
Peas(Green)	Cotton Seed
Tomato	Copra (Coconut)
Cauliflower	Gingelly Seed (Sesamum)
Brinjal	Linseed
Okra (Lady finger)	Castor Seed
Cabbage	Niger Seed
b2. FRUITS	Safflower (Kardi Seed)
Banana	Sunflower
Mango	Soyabean
Apple	c. OTHER NON-FOOD ARTICLES
Orange	Hides(Raw)
Cashew nut	Skins(Raw)
Coconut(Fresh)	Tanning Materials
Papaya	Sugarcane

Grapes	Tobacco
Pineapple	Guar Seed
Guava	Raw Rubber
Litchi	Logs & Timber
Lemon	Fodder
Sapota	d. FLOWERS
c. MILK	Rose
Milk	Jasmine
d. EGGS,MEAT & FISH	Marigold
Egg	(C) MINERALS
Fish-Inland	a. METALLIC MINERALS
Fish-Marine	Bauxite
Mutton	Chromite
Beef & Buffalo Meat	Copper Ore
Zinc Concentrate	Vegetables Seeds
Manganese Ore	c. GRAIN MILL PRODUCTS
Iron Ore	Maida
b. OTHER MINERALS	Wheat Flour (Atta)
Phosphorite	Gram Powder (Besan)
Fireclay	Sooji (Rawa)
Gypsum	Rice Bran
Kaolin	Wheat Bran
Dolomite	Beaten Rice Flakes (Chire)
Magnesite	Maize Atta
Barytes	Other Grain Mill Products
Limestone	d. BAKERY PRODUCTS
Steatite	Biscuit / Cookies
Graphite	Bread & Buns
Sillimanite	Cakes & Muffins
c. CRUDE PETROLEUM	e. SUGAR, KHANDSARI & GUR
Crude Petroleum	Sugar
II FUEL & POWER	Gur
A. COAL	Khandsari
Coking Coal	Molasses
Non-Coking Coal	Bagasse
Coke	Sugar Confectionary
Lignite	f. EDIBLE OILS
B. MINERAL OILS	Vanaspati
LPG	Groundnut Oil
Petrol	Palm Oil
Kerosene	Rice Bran Oil
Aviation Turbine Fuel	Cotton Seed Oil
High Speed Diesel	Mustard & Rapeseed Oil
Naphtha	Soyabean Oil
Light Diesel Oil	Copra Oil
Bitumen	Sunflower Oil
Furnace Oil	Gingelly Oil
Lubricants	g. OIL CAKES

C. ELECTRICITY	Cotton Seed Oil Cake
Electricity (Domestic)	Rice Bran Extraction
Electricity (Commercial)	Mustard Oil Cake
Electricity (Agricultural)	Groundnut Oil Cake
Electricity (Railway Traction)	Other Oil Cakes
Electricity (Industry)	h. TEA & COFFEE PROCESSING
III MANUFACTURED PRODUCTS	Tea Leaf (Blended)
(A) FOOD PRODUCTS	Tea Leaf (Unblended)
a. DAIRY PRODUCTS	Tea Dust (Blended)
Powder Milk	Tea Dust (Unblended)
Ghee	Coffee Powder
Butter	i. MANUFACTURE OF SALT
Ice Cream	Salt
Condensed Milk	j. OTHER FOOD PRODUCTS
b. CANNING, PRESERVING & PROCESSING OF FOOD	Cashew Kernel
Canned Fish	Gola (Cattle Feed)
Fish Meal	Papad
Processed Prawn	Cashew nut (Roasted)
Canned Meat	Mixed Spices
Soya Preparations (Excluding Oil)	Synthetic Fibres
Readymade / Instant Food Powder	b2. MAN MADE FABRIC
(B) BEVERAGES, TOBACCO & TOBACCO PRODUCTS	Mixed Fabrics
a. WINE INDUSTRIES	Cotton Knitted Fabrics
IMFL - Blended	Synthetic Suitings (incl.blended)
IMFL - Malted but not Blended	Synthetic Grey Cloth
Rectified Spirit	Nylon Thread
b. MALT LIQUOR	Polyethylene Fabrics
Beer	Other Synthetic Fabrics
Toddy (or Taddy)	c. WOOLLEN TEXTILES
c. SOFT DRINKS & CARBONATED WATER	Woollen Yarn
Soda Based Soft Drinks	Woollen Carpets
Soft Drink Concentrates	Woollen Shawls
Aerated Water (All Types)	Woollen Hosiery goods
Non-Alcoholic Beverages (All Types)	Woollen Cloth
Mineral Water	Woollen Cardigans/Sweaters
d. MANUFACTURE OF BIDI,CIGARETTES,TOBACCO & ZARDA	Blankets
Cigarette	Other Woollen Garments
Bidi	d. JUTE HEMP & MESTA TEXTILES
Dried Tobacco	Jute Sacking Cloth
Chewing Tobacco (scented or not)	Jute Sacking Bag
Zarda	Tyre Cord Fabric
(C) TEXTILES	Jute Yarn
a. COTTON TEXTILES	Gunny and Hessian Cloth
a1. COTTON YARN	e. OTHER MISC. TEXTILES
Cotton Yarn (Unbleached)	Cotton Shirts
Cotton Yarn (Bleached)	Terene Garments

Cotton Yarn (Dyed)	Cotton Children suits
Finished / processed cotton yarn (not knitted)	Terry Towel
Finished / processed cotton yarn (knitted)	Gunny bags (Non Laminated)
a2. COTTON FABRIC	Coir Mats & Matting
Cotton Cloth finished /processed	Cotton Under Garments
Grey Cloth (Bleached / Unbleached)	Cotton Pillow Cover
Cotton Textiles Dyed/printed	Cotton Dressing Gown
Bed Cover & Bed Sheet	(D) WOOD & WOOD PRODUCTS
Other Cotton Hosiery Goods	a. TIMBER / WOODEN PLANKS
Cotton Linters	Sawn/Resawn Timber/Wooden Planks
Cotton Shirting	Sawn Timber Posts / Squares
Cotton Trousers / Pants	b. PROCESSED WOOD
Cotton Towel Cloth	Processed/ Sized Wood Cutting
Cotton Durries	Wooden Almirah / Cabinets/ Cupboard
Furnishing cloth	Wooden Crates & Packing Box
b. MAN MADE TEXTILES	Wooden Chair
b1. MAN MADE FIBRE	c. PLYWOOD & FIBRE BOARD
Polyester Yarn	Plywood Board
Texturised and Twisted Yarn	Insulation Board
Polyester Staple Fibre	d. OTHERS
Synthetic Yarn	Veneered Particle Board
Viscose Staple Fibre	Veneer Wood
Acrylic Fibre	(E) PAPER & PAPER PRODUCTS
Acrylic Yarn	a. PAPER & PULP
Nylon Yarn	Printing and Writing Paper
Viscose Yarn	Kraft Paper & Bags
Laminated Paper	Plastic Bottles
Paper for Printing / Poster	Plastic Cabinet
Maplitho Paper	Dot pen with refill
Computer Stationery	Tooth brush
Paper Rolls	Plastic Containers
Paper Cone & Tube	Plastic/PVC Shoes
Cream Laid woven Paper	Syringe
Paper Pulp	Polyester Film
b. MANUFACTURE OF BOARDS	Polyester Chips
Corrugated Sheet Boxes	Expandable Polystyrene
Paper Cartons / boxes	V Belt
Bristle Paper Board	Plastic/PVC Chappals
Card Board	Plastic Rolls
c. PRINTING & PUBLISHING	Polythene/PVC Foam
Books/ Periodicals/ Journals	HDPE Bag
Newspaper	HDPE Woven Sacks
Other Printing and Publishing	HDPE Woven Fabric
(F) LEATHER & LEATHER PRODUCTS	Other Plastic Products
a. LEATHERS	c. RUBBER PRODUCTS
Vegetable Tanned Leather	Rubber Seat Assembly
Crome Tanned Leather	Seamless Tubes & Pipes
Leather Shoe lining	Rubber Moulded goods

b. LEATHER FOOTWEAR	Rubber Foot wear
Leather Shoe Upper	Synthetic rubber compound
Foot Wear/ Safety Boot	Reclaimed Rubber
Leather Chappals/ sandals	Rubber Components & Parts
Leather Sole	Automobile Rubber Padding
Other Leather Foot Wear	Rubber Brakes
c. OTHER LEATHER PRODUCTS	Rubber Transmission belt
Leather Garments & Jackets	Foot Ball
Leather Bags	Other Rubber Products
Leather Handbags / Wallets	(H) CHEMICALS & CHEMICAL PRODUCTS
Leather Gloves	a. BASIC INORGANIC CHEMICALS
Leather Harness Goods	Carbon & It's Compound
(G) RUBBER & PLASTIC PRODUCTS	Acid (Inorganic)
a. TYRES & TUBES	Caustic Soda & Soda Ash
a1. TYRES	Oxygen
Cab/Car Tyre	Lime & Calcium Carbonate
Bus/truck Tyre	Alumina & Aluminium Salt
Scooter / Motor cycle Tyre	Zirconion Silicate
Tractor Tyre	Hydrogen Peroxide
Cycle /Cycle rickshaw Tyre	Titanium Dioxide
a2. TUBES	Zinc Oxide
Cycle / Rickshaw Tube	Sodium Salt
Motor Tube	Carbon Di-Sulphide
Other Rubber Tubes	Ammonia (Gas / Liquid)
b. PLASTIC PRODUCTS	Argon Gas
Plastic/PVC Pipe	Chlorine
Plastic Components / Accessories	Carbon Dioxide Gas
Rigid PVC	Hydrogen
Plastic/LDPE/Polythene Bag	Nitrogen (Gas / Liquid)
Plastic Films & sheets	Foundry Chemical
Polythene/Plastic Granules	Other Inorganic Chemicals
Plastic/ PVC Suitcases	b. BASIC ORGANIC CHEMICALS
	Ayurvedic Medicines
Fatty Acid	Others
Acetic Acid & Its Derivatives	g. PERFUMES, COSMETICS, TOILETRIES ETC
Alcohol & Mixture	Toilet Soap
Amines	Washing Soap
Glycol	Washing Powder
Fatty Alcohol	Floor Cleaners
Naphthalene / Aniline	Bleaching Powder
Vegetable Starch	Tooth Paste / Tooth Powder
Essence/Flavour used in food products.	Hair / Body Oils
Ice Block/ Cube (non edible)	Perfume / Scent
Brine Water / Distilled Water	Cream / Moisturizer
Organic Solvent	Face / Body Powder
Formaldehyde	Other Flavoured Powder
Menthol	Shampoo

Phenol or Phenol Extract	Wax
Acid (Organic)	Shaving Cream
Aromatic Chemicals	Hair Dye
Leather Chemicals	h. TURPENTINE, PLASTIC CHEMICALS
Petrochemical Building Blocks	Thermocol
Other Organic Chemicals	Olio Resin & Gelatin
c. FERTILIZERS & PESTICIDES	Adhesive & Gum
c1. FERTILIZERS	Turpentine Oil
Urea	Other Plastic Chemicals
Ammonium Sulphate	i. POLYMERS INCLUDING SYNTHETIC RUBBER
Other Nitrogenous Fertilizer	Polymers
Di Ammonium Phosphate	Synthetic Resin
Dicalcium Phosphate	Synthetic Rubber
Other Phosphatic Fertilizers	Polymer Products
Organic Manure	j. PETROCHEMICAL INTERMEDIATES
Fertilizer (Others)	Non-Cyclic Compound
c2. PESTICIDES	Glycol
Endosulfan	Polyol
Cypermethrin	Sulphur & Sulphur Powder
Weedicides	Rubber Chemicals
Insecticides	Other Petrochemical Intermediates
Other Pesticides	k. MATCHES,EXPLOSIVES & OTHER CHEMICALS
d. PAINTS, VARNISHES & LACQUERS	Safety Matches/ Match Box
Paints	Explosives
Chemical Colours	Agarbattis
Lacquer & Varnishes	Photographic Goods
Distemper	Castor Oil
Thinner	Yeast used in Food Industry
Ink	Additives
e. DYESTUFFS & INDIGO	Hardeners
Dye & Dye Intermediates	(l) NON-METALLIC MINERAL PRODUCTS
Pigment & Pigment Intermediates	a. STRUCTURAL CLAY PRODUCTS
f. DRUGS & MEDICINES	Bricks & Tiles
Antibiotics	Polished Granite
Vitamins	Marbles
Vaccines	Stone (Chip/Crushed/fnished/Slab)
Paracetamol/Analgesic	b. GLASS,EARTHENWARE, CHINAWARE & THEIR PRODUCTS
Antacid and Digestive Preparations	Glass Bottles & Bottleware
Gelatine Capsules (empty)	Ayurvedic Medicines
Laminated Glass	Other Alloys
Fibre Glass & Glass Sheet	a6. CASTINGS & FORGINGS
Toughened Glass	Iron Castings
Pressed Glassware	Steel Castings
Ophthalmic Lens	Die Forging & Stamping
Glass Vials	a7. FERRO ALLOYS
Non-Ferrous Sanitary fittings	Ferro Chrome

Filter Elements	Ferro Manganese
Porcelain Crockery	Ferro Silicon
c. CEMENT & LIME	b. NON-FERROUS METALS
Grey Cement	b1. ALUMINIUM
White Cement	Aluminium Ingots
Slag Cement	Aluminium Coils/Rolls
Lime	Aluminium & Alloys
d. CEMENT, SLATE & GRAPHITE PRODUCTS	Aluminium Casting
Graphite Rods	Aluminium Seals
Graphite Amorphous	Aluminium Foil /Foil Bag
Pencil	Aluminium Pipe & Tubes
Asbestos Corrugated Sheet	Aluminium Utensils
Railway Sleeper	Aluminium Wire
Concrete Poles & Posts	b2. OTHER NON-FERROUS METALS
Hume Pipes & Spun Pipes	Copper / Copper Ingots
Other Cement Product,	Copper Wire (All Types)
(J) BASIC METALS, ALLOYS & METAL PRODUCTS	Copper Products (other than wire)
a. FERROUS METALS	Brass
a1. IRON & SEMIS	Zinc
Sponge Iron	Lead
Pig Iron	Chromium / Chrome
Melting Scrap	Non Ferrous Alloys
Pencil Ingots	Non-Ferrous Casting & Forging
Billets	C. METAL PRODUCTS
Slab	Gold & Gold Ornaments
a2. STEEL: LONG	Silver
Rebars	Iron & Steel Wire
Rounds	Other Metal Wires & Wire products
Wire Rods	Nuts/Bolts/Screw/ Washers
Angles	Cylinder
Joist & Beams	Cylinder Liners
Rails	Steel Structures
a3. STEEL: FLAT	Steel Balls
HRC	Fabricated Metal Products
Plates	Furniture
CRC	Fixtures
GP/GC Sheets	Steel Frames
a4. STEEL: PIPES & TUBES	Metal Moulds and Dyes
Welded Pipe	Pipes/Tubes/Rods/Strips
a5. STAINLESS STEEL & ALLOYS	Cistern Fittings
Steel Rods	Welding Rods
Sheets	Metal Containers
Steel	Utensils(other than Aluminium)
Pressure Cooker	Engines
Chain	Earth Moving Machinery
Locks	Compressors
Safety Helmet	Meters / Starter (non-electrical)
Other Metal Products	Watches

(K) MACHINERY & MACHINE TOOLS	Weighing Scales
a. AGRICULTURAL MACHINERY & IMPLEMENTS	Sewing Machines
Harvester	Solar Power System & Windmill
Sprinkler	Other Non Electrical Machinery
Thresher	g. ELECTRICAL MACHINERY, EQUIPMENT & BATTERIES
Separators & Driers	Electrical Pumps
Other Agriculture Implements	Transformer
b. INDUSTRIAL MACHINERY	Electric Motors
Boiler & Accessories	Power Supply (DC)
Industrial Furnaces	Electric Switch Gears
Coupling	Relay /Contactor
Filtration Equipment	Electric Connectors / Plugs /Sockets/holders
Material Handling Equipments	Electrolytic Condensers
Textile Machinery	Electric Switches
Rubber Machinery	Converter / Inverter
Cranes	Electric Generators
Lifts	Electric Motor Starters
Oil Mill Machinery	Control equipments
Rice Mill Machinery	Regulators
Sugar Machinery	Distribution Boards
Food/ Beverages/Tobacco Processing Machinery	Other Electric Meter
Mining/Quarrying/Metallurgical Machinery/Parts.	Electrical Stamping Lamination
Plastic Machinery	Electrical Signaling Equipment
Fasteners	Batteries
Ball/Roller Bearing	Battery Dry cells
Pump & Assembly	Battery Charger
Drive Equipment	Other Electric Machinery & Equipments
Heat Exchanger	h. ELECTRICAL ACCESSORIES, WIRES, CABLES ETC.
Hydraulic Equipment	Conductor
Pneumatic Tools	Insulators
Industrial Valves	Lamps
Chemical Plant Equipments	Magnets
Other Industrial Machinery	Fluorescent Tubes
c. CONSTRUCTION MACHINERY	Air Break Switches/Circuit Breaker
Loader	PVC Insulated Cable
Concrete Vibrator & Mixture	Kit-Kat /Fuse / Fuse wire
Other Construction Machinery / Equipment	Electrical Wires
d. MACHINE TOOLS	Heating Elements
Drilling Machines	Other Electric Accessories
Lathes	i. ELECTRICAL APPARATUS & APPLIANCES
Grinding Wheels	Washing / Laundry Machines
Cutting Machine	Fans
Gear Cutting Machines	Grinding /Wet Coffee Machinery
e. AIR CONDITIONER & REFRIGERATORS	Flash Light/ Torch
Air Conditioners	UPS / Stabilizer

Refrigerators	Gauges
Chillers	Geared Motor
f. NON-ELECTRICAL MACHINERY	Radiator & Coolers
	Electric Magnet Brakes
	Lamp
	Horn
T.V. Accessories	
Sensors	Microwave Oven
Optical Instruments	j. ELECTRONICS ITEMS
Video CD Player	T.V.Sets
Resistance /Resistor	
Semiconductor Devices	c. OTHER TRANSPORT EQUIPMENTS
Capacitors	Railway Brake Gear
Electronic PCB /Micro Circuit	Railway Axle & wheel
Amplifier	Other Rail Equipments
Computer Power Supply System (SMPS)	Bi-Cycles
Fibre Optic Cable	Parts of Ships/Boats etc.
Other Electronics Items	Shafts (All Kinds)
k. IT HARDWARE	
Computers	
Computer Peripherals	
I. COMMUNICATION EQUIPMENTS	
Telecommunication Exchange	
Dish Antenna	
Other Communication Equipments	
(L) TRANSPORT, EQUIPMENT & PARTS	
a. AUTOMOTIVES	
Motor Vehicles	
Tractors	
Bus / Mini bus / Truck	
Auto Rickshaw / Tempo / Matador	
Motor Cycle / Scooter / Moped	
Trolleys / Tanker	
b. AUTO PARTS	
Gear Boxes & Parts	
Steering Gears	
Carburetors	
Clutch & Clutch Plates	
Crankshafts	
Suspension	
Axle	
Wheels & Parts	
Fuel Injection Equipments	
Silencer & Damper	
Wiper/Blade/Arm etc	
Piston & Compressor	
Coil Assembly (Ignition)	
Slider	
Engine Assembly & Chassis	

Appendix 2

STATEMENT SHOWING TENTATIVE BREAK-UP OF COST ELEMENTS IN THE COST OF PRODUCTION (Departmental option)

S.No	Cost Head	Open cast		Underground	
		%	%	%	%
1	Salaries & wages		20-25%		25-30%
2	Stores cost		35-40%		30-35%
	Diesel Cost	50-60%			
	Lubricant cost	15-20%			
	R&M expenses	10-15%		70-80%	
	Explosive cost/Roof bolting	10-15%		15-20%	
	Other Misc.	1-2%		5-10%	
	Total Stores				
3	Power Cost		3-5%		5-8%
4	Misc. Cost		7-10%		5-10%
5	Administrative cost		10-15%		3-5%
6	Mine closure cost		1-5%		1-2%
7	Interest on Working capital		3-5%		3-5%
8	Depreciation		15-20%		20-25%
9	Cost of Production				

Note:-

The % of cost element Break-up in cost of production highly varied based on the Mining conditions.