

**Rashtriya Chemicals and  
Fertilizers Limited**

(A Government of India Undertaking)

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**राष्ट्रीय केमिकल्स एण्ड फर्टिलाइजर्स  
लिमिटेड**

(भारत सरकार का उपक्रम)

*साथ बढ़ें समृद्धि की ओर*

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निगमित पहचान क्रमांक/Corporate Identification Number (CIN): L24110MH1978GO1020185

Ref. NoRCF/TR/TEchCorp.

Date: June 9, 2017

To  
The Member Secretary  
Industry-II, MoEFCC  
Indira Paryavaran Bhawan  
Vayu Wing, 3<sup>rd</sup> floor  
Aliganj, Jorbagh Road  
New Delhi-110 003

**Subject: Request for change of Project Proponent from M/s Rashtriya Chemicals & Fertilizers Limited (RCF) to M/s Talcher Fertilizers Limited (TFL)**

**Reference :(i) MoEF (IA Division) letter No. J-11011/231-IA II(I) dt. 26.11.2013 with respect to approved TOR for New Integrated Fertilizer complex at FCIL Talcher, Odisha**

**(ii) Letter ref.no TFL/EC/Talcher/2017/04 dt. 2.6.2017 from CEO, TFL (Copy enclosed)**

F.No. J-11011/231/2013-IA II(I)

Dear Sir,

With reference to the captioned subject, it may be submitted that in the year 2011, CCEA of GOI had approved revival of FCIL's closed Fertilizer complex at Talcher and also approved formation of a Joint Venture Company (JVC) for setting up coal based new Ammonia and Urea fertilizer plants at FCIL Talcher.

At that time formation of JVC was under process and RCF was nominated as nodal agency for carrying out all the activities related to above proposed project. While submitting Form-I application to MoEF, RCF was projected as Project Proponent (PP) of above fertilizer and chemical complex.

Now JVC M/s. Talcher Fertilizer Ltd (TFL) has been incorporated on 23<sup>rd</sup> November 2015. The present shareholding of the Company is as follows :

*J. A. R.*  
9.6.2017



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— 2 —

- RCF, CIL & GAIL - 29.67 % each
- FCIL - 10.99%

After formation of the JVC, all the activities which were earlier carried out by RCF are taken over by TFL.

In view of the above, it is requested that further correspondence related to environment clearance for the Talcher Project may be sent to new signatory authorized by CEO, TFL vide his above referred letter dt.2.6.2017.

Thanking you in anticipation,

(For & on behalf of RCF Ltd.)

3.1.12/2017  
Shri U.V. Dhatriak  
E.D.( P and PD )



# तालचेर फर्टिलाइजर्स लिमिटेड

## TALCHER FERTILIZERS LIMITED

[Erstwhile Rashtriya Coal Gas Fertilizers Limited]

निगमित पहचान क्रमांक /Corporate Identification Number (CIN) : U24120OR2015PLC019575

Ref No. : TFL/EC/Talcher/2017/04

Dated: 02.06.2017

### The Member Secretary (Industry -2)

Vayu Wing, 3<sup>rd</sup> Floor,  
Ministry of Environment, Forests & Climate Change,  
Jor Bagh Road,  
New Delhi- 110003

Ref : i) Our letter no : RCF/CORP/EC/TALCHER/08-2013/01, DATED 03.08.2013  
ii) Your F No. : J-11011/231//2013-IA II(I)

**Subject: Change of Authorized signatory for "New Coal based Ammonia/ Urea Fertilizer Project of M/s TFL at closed unit of FCIL Talcher".**

Sir.

With the reference to the above captioned subject, this is to inform you that Talcher Fertilizer Limited (Erstwhile known as Rashtriya Coal Gas fertilizer Ltd) a joint venture company comprising of GAIL, RCF, CIL and FCIL was formed on 13<sup>th</sup> November 2015. The present shareholding of the company is as follows:

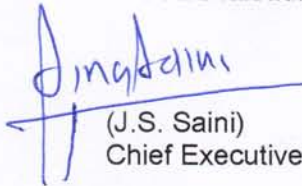
- RCF : 29.67%
- CIL : 29.67%
- GAIL : 29.67%
- FCIL : 10.99%

The earlier authorized representative for submitting the application /correspondence for environment clearance of the project was Mr. Anirban Kundu, Executive Director, RCF. Due to the superannuation of Shri Anirban Kundu and functioning of Talcher Fertilizer Limited, I hereby authorizing Shri Girindra Mohan, Chief Manager, for making application/correspondence related to Environment clearance. Further all future correspondence of TFL to be sent to TFL Project Office as mentioned below:

Talcher Fertilizer limited,  
GAIL Infohub, B-35& 36,  
Sector-1, Noida – 201301,  
Dist. – Gautam Budh Nagar (U.P.)

With kind regards.

Yours faithfully.

  
(J.S. Saini)  
Chief Executive Officer



# तालचेर फर्टिलाइजर्स लिमिटेड

## TALCHER FERTILIZERS LIMITED

[Erstwhile Rashtriya Coal Gas Fertilizers Limited]

निगमित पहचान क्रमांक /Corporate Identification Number (CIN) : U24120OR2015PLC019575

Ref. No.TFL/EC/Talcher/2017/07

Date:16/06/2017

The Member Secretary  
Industry-II, MoEFCC  
Indira Paryavaran Bhawan  
Aliganj, Jorbagh Road  
New Delhi- 110 003

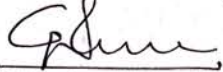
**Subject: Application for transfer of TORs approved vide letter Reference No.:**  
J-111011/231/2013-IA.II (I) dated 26<sup>th</sup> November, 2017, Extension Letter No  
J-111011/231/2013-IA.II (I) Dated 08<sup>th</sup> June 2017

Dear Sir,

Following information is being furnished for incorporation in the application for subject TORs approved for Talcher

User Agency/Proponent Details	Applicant Details
User Agency (Head Office): TFL	First Name: Girindra
State: Orissa	Middle Name:
District: Angul	Last Name: Mohan
Address: Plot 2/H, Kalpana Area, BJB Nagar, Khurda, Bhubaneswar, Khorda, Orissa, India	Gender: Male
Pin code: 751014	Designation: Chief Manager
Email Address: js02415@gail.co.in	Address: GAIL Infohub, B 35 & 36, Sector – 01, Noida – 201301,
Landline Telephone No. 0120-2518349	State of the Branch/Head Office: U.P.
Fax No.:	District of the Branch/Head Office: Gautam Budh Nagar
Mobile: 9601285142	Tehsil of the Branch/Head Office: Gautam Budh Nagar
Website(if any)	Pin code: 201301
Legal Status of User Agency: JVC	Email address: g.mohan@gail.co.in
Whether any proposal submitted by user agency in past: -	Landline Telephone No.:0120 - 4862400
	Fax No.:
	Mobile: 8811079351

(For & On behalf of TFL)

  
(Girindra Mohan)  
Chief Manager

PRE- FEASIBILITY REPORT  
ON  
**COAL BASED AMMONIA (2200 MTPD) AND NEEM  
COATED UREA (3850 MTPD)**  
AT  
CLOSED UNIT OF FCIL TALCHER UNIT  
OF  
TALCHER FERTILIZERS LIMITED



FOR  
GRANT OF TERMS OF REFERENCE

**Prepared By**  
**NABET ACCREDITED ACO**



**PROJECTS & DEVELOPMENT INDIA LIMITED (A Govt. of India  
Undertaking)**

**PO: Sindri - 828122, Dist: Dhanbad (Jharkhand)**

**QCI - NABET ACCREDITATION NO. 120 AS ON 10<sup>TH</sup> APRIL 2017**

**MAY 2017**

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## EXECUTIVE SUMMARY

**0.1** The closed unit of Talcher Fertilizer complex of the Fertilizer Corporation of India Limited (FCIL) was based on the gasification of coal. Since 2002 FCIL Talcher is totally closed and there is no activity related to production of urea. Several attempts were made to revive Talcher fertilizer unit but all in vain.

A proposal was put-up before Cabinet Committee of Economic Affairs (CCEA) for setting up a coal based fertilizer and chemical complex within plant premises of closed unit of FCIL Talcher. The CCEA also approved formation of Joint Venture Consortium to set up proposed fertilizer and chemical complex. As per the approval of CCEA, a Joint venture consortium was proposed to be incorporated jointly by M/s Rashtriya Chemicals & Fertilizers Ltd (RCF), M/s Coal India Ltd. (CIL), GAIL (India) Limited & Fertilizer Corporation of India Limited (FCIL) with RCF as nodal agency and coordinator of the Joint venture.

Formation of JVC was already in the process after approval of CCEA and after completing all the formalities, a Joint venture consortium in the name of Talcher Fertilizers Limited (TFL) has taken place in 2015. TFL is a Public Company incorporated on 13 November 2015. It is classified as Non-Govt. Company and is registered at Registrar of Companies, Cuttack.

Rashtriya Chemicals & Fertilizers Ltd. (RCF) & Fertilizer Corporation of India Ltd (FCIL) are Public Sector Units under the Ministry of Chemicals & Fertilizers. Coal India Ltd (CIL) is public sector undertaking under the Ministry of Coal, Govt. of India and GAIL (India) Limited is the public sector undertaking under the Ministry of Petroleum & Natural Gas, Govt. of India.

Considering the increasing demand for fertilizers in the country, TFL intends for setting up coal based fertilizer project for production of 2200 MTPD Ammonia and 3850 MTPD Urea along with necessary offsite and utility facilities, within the premises of FCIL at Talcher Unit, Angul district, in the State of Odisha, India.

As per EIA Notification, published in Gazette of India, Extraordinary Part-II, Section-3, sub-section (ii) of Ministry of Environment & Forest dated 14.09.2006, the proposed project falls in Activity 5(a), Category-A of “List of Projects or Activities Requiring Prior Environmental Clearance” and shall require prior Environmental Clearance from Ministry of Environment and Forests & Climate Change (MoEF&CC) on the recommendations of an Expert Appraisal Committee (EAC).

M/s TFL has appointed Projects & Development India Limited (PDIL), a Government of India Undertaking and a NABET accredited EIA consultant organization for all the jobs related to EIA / RA for proposed Coal based Fertilizer project.

- 0.2** The proposed fertilizer and chemical complex will be set up within the existing land of FCIL- Talcher unit. Total Area of Talcher Fertilizer complex is 904.53 Acre. Out of this total area, 444.6 acres of land is available for fertilizer complex and remaining area is for residential colony. The location of the proposed project falls around Geo-Coordinates 20<sup>0</sup>54'47.40"N latitude and 85<sup>0</sup>09'47.22"E longitude at an elevation of 98m above MSL.

Talcher fertilizer complex is located at Vikrampur in Angul district of Odisha on the Cuttack - Sambalpur National Highway NH-42. NH-42 is passing at distance of about 8 km from the site. The nearest railway station is Talcher at about 7 km and nearest airport Bhubaneswar is at 150 km and nearest port is Paradeep, 200 km by rail/road. The project site is well connected with Cuttack and the capital city Bhubaneshwar by rail and road. River Brahmini, a perennial river is at a distance of about 8 km from site to meet the requirement of water for the proposed project. Power can be drawn from the substation of OSEB at a distance of 2 km.

### **0.3 Process Units**

The Gasification unit consists of Gasification Island (Gasifier, Coal Milling & Drying), Gas Cooling, Acid Gas removal unit, Cryogenic Purification unit, Sulphur Recovery, CO-Shift & Air separation. They collectively allow for production of raw gas from coal and separation, purification, treatment & disposal of ash.

#### **Ammonia Plant**

Ammonia Plant will be laid out in single stream having a capacity of 2200 MTPD. The process technology for Ammonia plant shall be obtained from a reputed Ammonia Licensor. The main process sections shall be Synthesis gas compression, Ammonia Synthesis, refrigeration and storage.

#### **Urea Plant**

Urea Plant will be laid out in one stream having nameplate capacity of 3850 MTPD prilled neem coated urea. High pressure steam imported from captive

power Plant will be used to drive the CO<sub>2</sub> compressor with extraction arrangement for meeting the process requirements.

### Power Generation

The power requirement for proposed project would be met by installing two nos. of STG sets of 35 MW each. During normal operation of the complex, both the generators will be running simultaneously at appropriate load.

## 0.4 NEED OF THE PROJECT

Urea as a major source of Nitrogen continues to dominate the scene of Nitrogenous Fertilizers in the country.

### 0.4.1 Production and Consumption Trends

Though the level of fertilizer consumption in the country has all along been very low, the indigenous production of urea in India has always been lagging behind the consumption requirement except for the year 2000-01.

**Table-0.4.1**

#### Gaps between Consumption & Production of Urea

(Lakhs Tonne)

Year	Consumption	Production	Gap	% of Gap to Consumption
1960-61	0.14	0.12	(-) 0.02	14.29
1970-71	11.78	10.96	(-) 0.82	6.96
1980-81	60.44	33.84	(-)26.60	44.01
1990-91	140.76	128.35	(-)12.41	8.82
2000-01	191.86	196.23	(+) 4.47	2.28
2005-06	222.95	200.85	(-)22.10	9.91
2006-07	233.38	203.10	(-)30.28	12.97
2007-08	259.63	198.60	(-)61.03	23.51
2008-09	266.49	199.22	(-)67.27	25.24
2009-10	266.73	211.12	(-)55.21	20.85
2010-11	281.13	218.72	(-)62.41	22.20
2011-12	295.65	219.92	(-)73.73	25.61
2012-13	300.02	225.86	(-)74.16	24.72
2013-14	304.54	227.18	(-)77.36	25.40
2014-15	306.10	225.93	(-) 80.17	26.19
2015-16	306.35	244.61	(-) 61.49	20.08

(-) deficit (+) surplus

It may be seen from the above table that gap increased from 0.82 Lakh MT in 1970-71 to 26.61 Lakh MT in 1980-81 and to 61.49 Lakh MT in 2015-16. Surplus availability of urea in the year 2000-01 has been due to decline in consumption on one hand and excess domestic availability particularly in view of high opening stock on the other.

#### 0.4.2 Future Supply Estimates

##### 0.4.2.1 Indigenous Existing Supply

To meet the domestic demand for urea, production from the existing units in the country stood at 244.61 Lakh MT during 2015-16. Almost 21 plants operated above 100 % capacity utilization. It is likely that the same trend shall be continued in the near future.

##### 0.4.2.2 Additional Capacity

Around 12.70 Lakh MT of additional capacity of urea through green field project by Matrix Fertilizers & Chemicals at Panagarh (West Bengal) is under implementation and commercial production is likely to start in 2017-18.

##### 0.4.2.3 Projected Demand-Supply Gap

Urea demand-supply scenario in India that is likely to emerge in FY18 to FY25 is shown in Table- 0.4.2 and Figure 0.4.1.

**Table- 0.4.2: Projected Demand Supply Gap for Urea in India**  
(million tonnes)

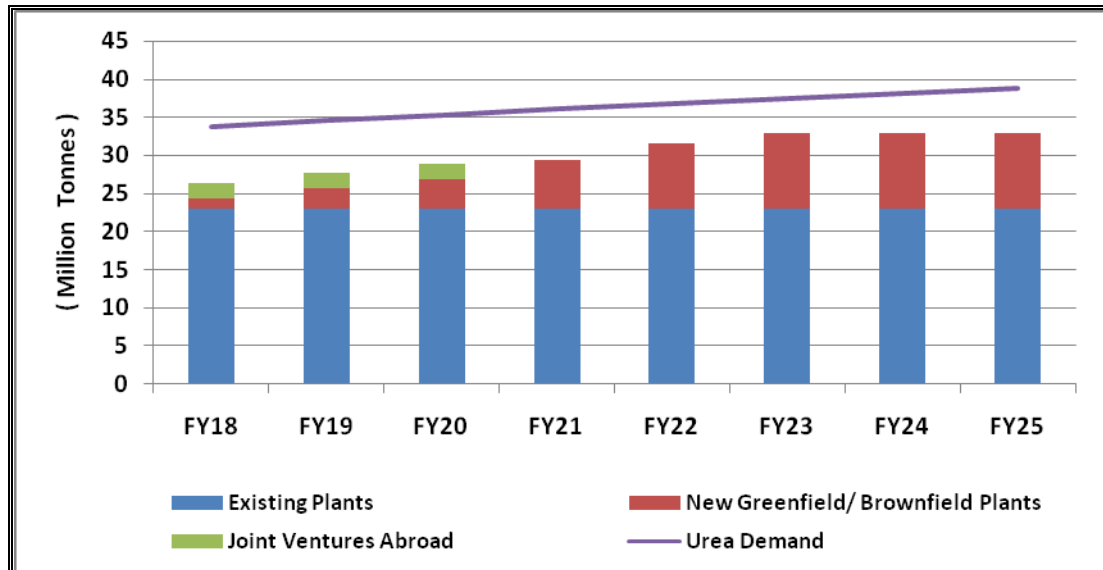
Year	Urea Demand	Supply Estimates				Demand Supply Gaps
		Existing Units	New Greenfield / Brownfield Plants	Joint Ventures Abroad	Total	
FY18	33.754	23.030	1.270	2.000	26.300	7.454
FY19	34.536	23.030	2.600	2.000	27.630	6.906
FY20	35.307	23.030	3.870	2.000	28.900	6.407
FY21	36.064	23.030	6.410	-	29.440	6.624
FY22	36.808	23.030	8.540	-	31.570	5.238
FY23	37.418	23.030	9.810	-	32.840	4.578
FY24	38.136	23.030	9.810	-	32.840	5.296
FY25	38.830	23.030	9.810	-	32.840	5.990

Source – PDIL Estimates

The projected deficit level of 6 million tonnes of urea in FY20 is based on certain assumptions on the demand as well as supply side. On the supply side, a

critical assumption is that the existing installed capacity is not only retained in good working condition but is also able to maintain the high capacity utilization levels. The gas based plants commissioned in 1980's and thereafter would call for timely revamping and retrofitting to ensure that they are able to maintain present operating rates and low energy consumption.

**Figure: Demand-Supply Scenario in India over the period FY18 to FY25**



!

The wide gap between consumption and production of urea has to be fulfilled through higher imports. In the past, India has imported urea from various countries through ports located in the eastern and western coast of the country. In FY16, around 62% of total urea imports have been taken place through ports located on the west coast as shown in Table 0.4.3 below.

**Table 0.4.3: Port - wise Urea Imports**

				(Million tonnes)
S.No.	West Coast Port	FY15	East Coast Port	FY15
1.	Hazira	0.383	Gangavaram	0.246
2.	Kandla	1.356	Kakinada	1.065
3.	Mundra	1.903	Karaikal	0.430
4.	Mangalore	0.317	Krishnapatnam	0.935
5.	Pipavav	1.431	Paradip	0.051
6.	-	-	Tuticorin	0.085
7.	-	-	Vizag.	0.491
8.	-	-	Chennai	0.056
	<b>West Coast Total</b>	<b>5.390</b>	<b>East Coast Total</b>	<b>3.359</b>

*Source - Department of Fertilizers, Govt. of India*

#### 0.4.2.4 Available Options

The apparent choice to fulfill this demand supply gap may be through increase in indigenous capacity by expansion/grass-root plants, by joint venture and import of urea.

#### 0.4.2.5 Expansion / Grass root plants

Around 1.27 million tonnes of additional capacity of urea through green field project of Matix Fertilizers & Chemicals at Panagarh (West Bengal) which is under implementation and commercial production of the plants is likely to start in FY 2017-18.

Over the period 2019 -2025, seven more projects are expected to start which are presently under active consideration by the management of the companies / the Govt. of India. These projects are Ramagundam Fertilizers & Chemicals at Ramagundam (Telangana), Chambal Fertilizers & Chemicals at Gadepan (Rajasthan), Rashtriya Chemicals & Fertilizers at Thal (Maharashtra) and FCIL at Sindri (Jharkhand) / FCIL (Gorakhpur) / HFCL (Barauni)/ BVFCL (Namrup).

#### 0.4.2.6 Joint Venture Abroad

Due to constraints in the domestic availability of natural gas for increasing the production of urea in the Country, the Government of India is encouraging Indian fertilizer companies to have joint venture projects with buy back arrangements in gas rich countries.

One Joint Venture Project by Oman India Fertilizer Company (OMIFCO) is already operating in Oman. OMIFCO, the joint venture company, will supply around 2 million tonnes of urea to Government of India under off-take agreement at fixed long term price upto the end of FY20.

Other JV Projects in pipeline are in the countries like Iran, Ghana and Nigeria, The progress of these projects is not very encouraging.

#### 0.4.2.7 Import

The quantity of urea available for international trade is limited. The analysis of past 15 years data reveal that increase and decrease in the world export supply or import demand by 10 million MT has led to violent fluctuations in the prices from US\$ 70 to US\$ 800 per MT of urea. This variation in prices is basically due to changes in the output by either 'low cost exporters' or 'swing producers' who account for about 6 million MT of world trade. Low cost producers are export

oriented facilities based on low cost gas. Swing producers are primarily domestic suppliers who either (i) enter the export market when prices are high even ignoring domestic supplies, or (ii) stop even domestic supplies when prices are low. Manufacturers in free markets like USA fall under this category.

When the demand is strong, it is the demand-supply balance which would determine the price level that the market can sustain at that particular point of time. It has no relation to manufacturing costs.

When market is weak, it is the cost profiles of the producers and more specifically their cash costs which would determine the price levels. Low cost exporters do not normally reduce their export volumes and prefer to maximize sales volumes even when prices are dropping so long as they recover their cash costs. Generally, the swing producers have higher manufacturing costs and they would start exiting the market as prices drop, thereby reducing exports to balance the reduction in import demand and maintain prices.

It is apparent that urea is a strategic commodity and capacity of international market is rather limited to meet significant increases in demand. An additional demand of even 1-2 million MT would cause serious imbalance and prices would shoot up. Higher levels of demand could result in a situation when urea would not be available in spot markets at any price. Therefore, it would not be prudent to depend on imports for more than 5-6 Lakh MT of urea. This in other words means that the country shall be required to have in place additional domestic capacity of urea for indigenous consumption.

#### **0.5.0 ENVIRONMENTAL CONSIDERATION**

Though Talcher industrial area falls in the list of 88 industrial clusters identified for preparation of Comprehensive Environmental Pollution Index (CEPI). Necessary Management Plan has been prepared and being implemented with positive impact and it has been found that there is considerable reduction in CEPI index. It is also worth mentioning that the moratorium has been lifted in 2013. The proposed fertilizer plants are a new generation plant with best available technology and which has built-in pollution abatement system. The plants are based on optimum utilization of energy which will reduce pollution load.

#### **0.6.0 EMPLOYMENT GENERATION**

It is envisaged that the proposed project would generate sufficient employment opportunity during construction phase as well as operation basis. For carrying out

construction related activities, it is envisaged to engage skilled, semi-skilled and unskilled workers from local area to the maximum extent.

### 0.6.1 Manpower Requirement

Based on the organizational pattern envisaged for, the total number of operating personnel required to operate plant and storage facilities in three shifts a day at full rated capacity and other auxiliary / statutory facilities works out to be 550 persons and broad break-up of this has been presented in Table-6.1.

**Table-6.1**

#### Man Power Requirement

Sl. No.	Department	Coal gasification / Ammonia	Urea	CPP, SGP & Off-site	Others
1.0	Managing Director			1	
2.0	M.D. Office staff			3	
3.0	Executive Director (O&M)			1	
4.0	Secretary to ED (O&M) & staff			3	
5.0	General Manager (Operation)			1	
6.0	Secretary to GM (O) & staff			3	
7.0	General Manager (Maintenance)			1	
8.0	Secretary to GM (M) & staff			3	
	<b>Sub-Total (1 to 8)</b>			<b>16</b>	
9.0	Dy G M (Operation)			1	
10.0	Dy G M (opr- office)			2	
11.0	Dy G M (Maint)			1	
12.0	Dy G M (Maint off.)			2	
13.0	Dy G M (Finance & Administration)			1	
14.0	Dy G M (F & A) off			2	
15.0	Sr. Managers (O&M,T/S)			4	
	<b>Sub- Total(9 to 15)</b>			<b>13</b>	
16.0	Manager (O &M)	2	1	1	4
17.0	Shift-in-charge (O&M)	12	8	12	20
18.0	Chemist	8	3	2	5

Sl. No.	Department	Coal gasification / Ammonia	Urea	CPP, SGP & Off-site	Others
19.0	Operators & Foreman	68	36	36	10
20.0	Technician(M/M) G/s +Shift	28	14	14	15
21.0	Technician (E/M) G/s +Shift	12	6	7	6
22.0	Technician (I/M) G/s +Shift	12	6	6	6
23.0	Helpers operation	16	7	4	-
24.0	Helpers maintenance	12	8	8	2
	<b>Sub Total (16 to 24)</b>	<b>170</b>	<b>87</b>	<b>90</b>	<b>68</b>
	<b>Sub total (1-24)</b>	<b>170</b>	<b>87</b>	<b>90</b>	<b>97</b>
	<b>Total (1-24)</b>	<b>444</b>			
<b>25</b>	Finance/TS & Others	<b>106</b>			
	<b>Grand Total (1 to 25)</b>	<b>550</b>			

### 0.7.0 REHABILITATION & RESETTLEMENT PLAN

Old & closed FCIL Talcher fertilizer complex is spread over an area of 904.53 acres of land. The total area of land is under the administrative possession of FCIL Talcher. The proposed fertilizer project shall be implemented within plant premises of existing Talcher Fertilizer Complex. Hence, any planning with respect to rehabilitation & resettlement is not applicable.

### 0.8.0 PROJECT SCHEDULE & PROJECT FINANCIALS

#### 0.8.1 Project Schedule

The likely date of start of construction shall commence after getting Environmental Clearance (EC) from MoEF&CC. The project is scheduled to be completed within 42 months after financial closure.

#### 0.8.2 Cost Estimates

The Project Capital Cost of the proposed project 2200 MTPD ammonia and 3850 MTPD neem coated urea along with associated offsite & utility facilities, as per the scope is estimated at Rs. 788700 Lakh. Details of the estimated capital requirement are as under in Table-8.1.

**Table- 0.8.1**  
**Project Capital Cost Estimates**

<b>Sl. No.</b>	<b>Item</b>	<b>Amount (Rs. Lakhs)</b>
<b>1.0</b>	<b>Main Plants</b>	
1.1	Coal Preparation/Blending	7466
1.2	Air Separation Unit	47934
1.3	Gasification Incl. Purification	175505
1.4	Ammonia Synthesis	74537
1.5	Ash Handling System	15079
1.6	Urea Plant	75560
<b>2.0</b>	<b>Off-site facilities incl. spares</b>	
2.1	Steam Generation & CPP	100244
2.2	Other Off –Site Facilities	90730
3.0	Spares	23489
4.0	Project Management Charges	17243
5.0	Engineering Fees	38940
6.0	Non-plant Buildings	6000
7.0	Renovation of Township	6500
8.0	Land & Land Development	11002
9.0	Working Capital Margin	17011
10.0	Contingency	34512
11.0	Net Commissioning Expenses	3500
12.0	Interest During Construction	43474
	<b>Total Project Cost</b>	<b>788726</b>

### **0.8.3 Project Cost**

The total cost of the above proposed project has been estimated as Rs. 788700 Lacs and it is expected to be completed within 42 months after environmental clearance.

### **0.9.0 ANALYSIS OF PROPOSAL**

The final analysis of proposed may be briefed as under:

- a) The revival of FCIL Talcher will narrow the gap between demand and supply of Urea in central and eastern zone of India, especially in Bhubaneswar area.
- b) Industrial clusture of talcher has been identified as critically polluted zone but implementation of Management Plan prepared by CPCB/OSPCB has resulted positive impact with reduction in CEPI index. As a result the moratorium on Talcher Industrial Area has been lifted in 2013. Lifting of moratorium has enhanced the potential of further industrial development within Talcher Industrial Area.
- c) The implementation of recently developed Best Available Technology (BAT) which is a reliable and reproducible in different environment throughout the globe will save energy consumption for production of ammonia / neem coated urea.
- d) The new technology will reduce dependency of import of fertilizer in the country thereby resulting in saving of foreign exchange.
- e) The proposed project is a part of “**India Low Carbon Strategy**” and INTENDED NATIONALLY DETERMINED CONTRIBUTION (INDC) under UNEPCCC Protocol.
- f) The policy for revival of FCIL Talcher in the name of Talcher Fertilizers Limited (TFL) is the result of restless efforts of GOI to bridge up the gap between demand and supply of fertilizer in the country. Several policies framed and implemented from time to time under strict close observation of DoF and Niti Ayog and PMO.
- g) The proposed project is a part of “**India Low Carbon Strategy**” and INTENDED NATIONALLY DETERMINED CONTRIBUTION (INDC) under UNEPCCC Protocol.
- h) The policy for revival of FCIL Talcher in the name of Talcher Fertilizers Limited (TFL) is the result of restless efforts of GOI to bridge up the gap between demand and supply of fertilizer in the country. Several policies framed and implemented from time to time under strict close observation of DoF and Niti Ayog and PMO.

### 0.10.0 Project Proposal

The project proposal is limited to production of coal based 2200 MTPD of Ammonia and 3850 MTPD of Urea project based on recent best available technology comprising following main products and their value-added derivatives. The important facilities are presented below in Table-E.1:

**Table-E.1**  
**Important Facilities Proposed at TFL, Talcher**

Sl. No.	Name of the Facility	Capacity
01.	Ammonia Synthesis gas for production of Ammonia from Coal Gasification	243000Nm <sup>3</sup> /hr
02.	Carbon Dioxide for production of Urea from Coal Gasification unit	60480 Nm <sup>3</sup> /hr
03.	Ammonia	2200 MTPD
04.	Urea (Neem Coated)	3850 MTPD

The salient feature of the project is to utilize local natural resource (coal) and to reduce the stress on import of energy resources (NG). The project shall also utilize some of the existing facilities, which are in good condition or which can be made useable after refurbishment.

### 0.11.0 Justification of Proposed Project

- India is agro-based country and Urea as fertilizer is the prime need of agriculture.
- To bridge up the gap between demand and supply for Urea in the country.
- Better utilisation of local energy resource (coal) for production of ammonia and urea.
- Reduction in stress of import of energy resource (NG).
- A check on the monopoly of foreign traders.
- Ease in availability of fertilizers amongst farmers.
- FCIL, Talcher which is the site for the proposed project is nearer to the source of Coal.
- MCL, which is subsidiary of CIL, is having a number of coal blocks in Talcher Coal field area.
- Proper utilisation of available land & infrastructure in existing closed Talcher fertilizer complex and raw material.
- Lower capital cost compared to a grass root project resulting in lower cost of production due to easy available of land and water.

### 0.12.0 Project Benefits

The proposed project shall yield following benefits:

- A step towards food security of the country and timely availability of fertilizer to farmers in the command area.
- Lessen dependency on import of Urea.
- Effective utilization of indigenous engineering capability, manufacturing and infrastructure facilities.
- Production of urea due to ready availability of off-site facilities, infrastructure, economy of scale (due to higher capacity) and reduced energy consumption.
- Saving of precious foreign exchange.
- Use of updated technology by replacing obsolete.

#### **0.13.0 Sources of Raw Materials & Utilities**

The project would require approximately 249.6 MTPH ROM coal and 38.5 MTPH Pet Coke which will be transported to the site by CIL.

Power requirement for the proposed facilities will be met by installing 2 nos. of (Steam Turbine Generator) STG Sets of 35 MW each (2x35MW). Water requirement for the proposed facilities is 1437 m<sup>3</sup>/hr. or 34,488 m<sup>3</sup>/day. FCIL had a long term agreement with the State Government for the supply of 64,800 m<sup>3</sup>/day of the water from Brahmini River. All the infrastructure facilities i.e. Intake Well, Pump House and 900 mm dia. 10km long U/G pipeline network are available and can be utilized after minor refurbishment.

#### **0.14.0 Conclusion**

The proposal of revival of ammonia/urea plant at FCIL Talcher may be seen as a corrective step towards reducing the growing gaps between demand and supply for fertilizer urea in eastern zone and to minimize import dependency. Indirectly, by producing the fertilizer within the consumption region, it will lessen the pressure on the long distance transport network as well as the transport cost involved in such long distance movement between production units and the consuming points. The proposed plants at FCIL Talcher shall be implemented based on state of the art technologies.

## **1.0 INTRODUCTION**

### **1.1 Background**

The first fertilizer complex under the name of Sindri fertilizer factory was commissioned on 31st October 1951. A number of new plants were added to the factory as need arose time to time.

Fertilizer Corporation of India Limited (FCIL), incorporated in January 1961, operated four fertilizer units namely Sindri (Jharkhand), Ramagundam (Andhra Pradesh), Talcher (Orissa) and Gorakhpur (Uttar Pradesh).

Due to various reasons, all the units of FCIL including Talcher Unit continued to make financial losses. The company became financially sick and was referred to Board for Industrial and Financial Reconstruction (BIFR) in 1992. Subsequently BIFR gave its consent to wind up the company in the absence of any rehabilitation proposal. Finally, Govt. of India also approved the closure of fertilizer units.

### **1.2 Revival of Talcher Unit of FCIL**

A proposal was put-up before Cabinet Committee of Economic Affairs (CCEA) for setting up a coal based fertilizer and chemical complex within plant premises of closed unit of FCIL Talcher. The CCEA also approved formation of Joint Venture Consortium to set up proposed fertilizer and chemical complex. As per the approval of CCEA, a Joint venture consortium was proposed to be incorporated jointly by M/s Rashtriya Chemicals & Fertilizers Ltd (RCF), M/s Coal India Ltd. (CIL), GAIL (India) Limited & Fertilizer Corporation of India Limited (FCIL) with RCF as nodal agency and coordinator of the Joint venture.

Formation of JVC was already in the process after approval of CCEA and after completing all the formalities, a Joint venture consortium in the name of Talcher Fertilizers Limited (TFL) has taken place in 2015. TFL is a Public Company incorporated on 13<sup>th</sup> November 2015. It is classified as Non-Govt. Company and is registered at Registrar of Companies, Cuttack. M/s Rashtriya Chemicals & Fertilizers Ltd (RCF), M/s Coal India Ltd. (CIL), GAIL (India) Limited & Fertilizer Corporation of India Ltd. (FCIL) are the members of the consortium with RCF as nodal agency.

Rashtriya Chemicals & Fertilizers Ltd. (RCF), & Fertilizer Corporation of India Ltd. (FCIL) are Public Sector Units under the Ministry of Chemicals & Fertilizers, Gas Authority of India Ltd. (GAIL) a PSU under the Ministry of Petroleum & Natural Gas



(MoP&NG) and Coal India Ltd. (CIL) is public sector undertaking under the Ministry of Coal, Govt. of India.

## **2.0 SITE ANALYSIS**

### **2.1 Location of the Project**

The existing Talcher unit is located at Vikrampur in Angul district in the State of Odisha. Talcher site is located at Vikrampur in Angul district of Odisha on the Cuttack - Sambalpur National Highway NH-42. NH-42 is passing at about 8 km from the site. The nearest railway station is Talcher at about 7 km from the site. Nearest air port Bhubaneswar is 150 km, 3 hours journey by road/ rail. Nearest port is Paradeep, 200 km by rail/road. Talcher is situated at 21° 10" N Latitude and 82° 5" E Longitude.

Talcher site is very well connected with Cuttack and the capital city of Orissa Bhubaneshwar by rail and road. Bhubaneshwar has an airport, however both the cities have excellent infrastructures like hotels, professional collages, maintenance facilities etc. Water source is the perennial river Brahmini which is about 11 km from site. Water supply pipeline of adequate capacity already exists, which can be utilized for this project after refurbishing. Construction power can be drawn from the substation of Orissa state electricity board which is within 2 km from site.

### **2.2 Co-ordinates of the project**

The Geo Co-ordinate of Talcher fertilizer complex is around 21° 10" N Latitude and 82° 5" E Longitude at an elevation of 104m above MSL.

### **2.3 Details of Alternate Site**

The choice for selection of alternate site is not open as the proposed Ammonia / Urea Plants shall be installed within plant premises of old existing Talcher fertilizer complex. The project shall be centrally located within the battery limit of the complex. The proposed project shall be located within the existing premises of FCIL Talcher unit in the free unencumbered available land.

### **2.4 Ownership of the Land**

FCIL Talcher Unit: The total land area of the site is 933.60 acres out of which lease hold land from Government of Odisha is 923.27 acres and land purchased from private parties is 10.33 acres.

### **2.5 Eco-sensitive Areas**

Wild Life Sanctuary, National Park and Reserved Forest have not been identified in the vicinity of proposed project site.

### 3.0 PROJECT DESCRIPTION

#### 3.1 FACILITIES AVAILABLE AT CLOSED UNIT OF FCIL TALCHER

##### 3.1.1 Land

The total land available under FCIL - Talcher unit ownership is around 904.53 Acres including factory area and township. The total land is having free hold status. Out of the total available 904.53 Acres, almost 584 Acres is available for fertilizer complex and remaining area is for residential colony. The break-up of total land is as under:

**Table- 1.0**

**Distribution of Land of the proposed  
Fertilizer Complex**

<b>Particulars</b>	<b>Land in acres</b>
• Factory Area	518.99
• Oxidation Pond	5.12
• Railway Siding	45.60
• Township and Peripheral Roads	320.38
• Area given to Heavy Water Plant	14.44
<b>Total</b>	<b>904.53</b>

##### 3.1.2 Township

The total number of quarters in the township is around 500 of various sizes. The other facilities in the township include Guest House, Officers Club, Kalyan Kendra, Model English High School, JET Hostel etc.

##### 3.1.3 Railway Siding inside Factory

Railway siding exists inside the factory complex which can be used after refurbishment.

##### 3.1.4 Raw Water & Power

Water from Brahmini River has been considered as source of water proposed project. All necessary infrastructural facilities are available for drawl of water from Brahmini River.

### 3.1.5 Other Infrastructure Facilities

The other infrastructure facilities available with the existing plant premises include administrative building, canteen, first aid, central stores and yard, workshops, telephone exchange etc. As the Talcher unit is closed since last 13 years most of the facilities are not in usable condition.

### 3.2 Project Facilities

The proposed project consists of new coal based ammonia plant of 2200 MTPD and urea plant of 3850 MTPD capacity respectively and related offsite and utility facilities considering utilization of the existing facilities to the maximum extent possible. The details of the facilities of proposed Fertilizer Complex are given below in Table-3.2.

**Table – 3.2**

**List of Facilities in the proposed Fertilizer Complex**

Sl. No.	Plants & Facilities	Provisions
1.	Air Separation Unit	Provided
2.	Coal Gasification plant	243000 Nm <sup>3</sup> /hr Ammonia Syn. Gas 60480 Nm <sup>3</sup> /hr CO <sub>2</sub>
3.	Synthesis gas based Ammonia Synthesis Unit	2200 MTPD
4.	Urea Plant	3850 MTPD
5.	Product Storage & Handling Facilities a) Urea Silo b) Empty Bag Storage c) Bagged Storage d) Bagging Plant (for Urea)	45000 MT (existing) 2.0 Million 1000 MT (on platform) 10 (8+2) bagging streams each of capacity 60 T/hr with semi/fully automatic bagging and stitching facilities
6.	<b>Cooling Tower</b>	
	a) Ammonia Synthesis Unit & Captive Power Plant	(9+1) cells of 3750 m <sup>3</sup> /hr each
	b) Urea Plant	(5+1) cells of 3300 m <sup>3</sup> /hr each
7.	<b>Ammonia Storage (atmospheric)</b>	2 × 5000 MT
8.	<b>Power Generation &amp; Supply</b>	

Sl. No.	Plants & Facilities	Provisions
	a) Power Generation	STG - (2+0) × 35 MW
	b) Substation for receiving power from State Grid	Provided
	c) Emergency D.G. Set	1 × 2000 kVA
9.	<b>Steam Generation Facilities</b>	
	Coal fired boilers	(2+1) × (350+50*) MTPH
10.	<b>Water Supply Treatment &amp; Distribution</b>	
	a) Renovation of Pump House at river bed	Considered
	b) Renovation of Pipeline	Considered
	DM Water Plant	(2+1)×150 m <sup>3</sup> /hr
	Condensate Polishing Unit	(4+1)×175 m <sup>3</sup> /hr
11.	Yard Piping	Considered as per requirement
12.	<b>Instrument Air Facilities</b>	
	a) Compressor	(1+1)×3000 Nm <sup>3</sup> /hr
	b) Drying Unit	(1+1)×3000 Nm <sup>3</sup> /hr
	c) Receiver	Considered
13.	Safety & Fire Fighting System including fire water ring with Hydrant System	Considered
14.	Effluent Treatment	Considered
15.	Auxiliary services, workshop equipment, laboratory equipment, weighbridge, fire engine, continuous monitoring system, NDT equipment, telephone & telecommunication, Public Address System, etc.	Considered
16.	General & Welfare Facilities	Considered
17.	<b>Transport Facilities</b>	
	a) Locomotive	Two 1200 HP
	b) Railway Siding and lead line	Considered
	c) Road Transport	Considered
18.	Construction equipment	Considered
19.	Township & Public Building	Considered
20.	Non-plant Building	Considered

### 3.3 Description of Project

The proposed project is based on recent best available technology with an aim to optimum energy consumption per tonne of production by adopting the modern proven, state-of-the-art technology.

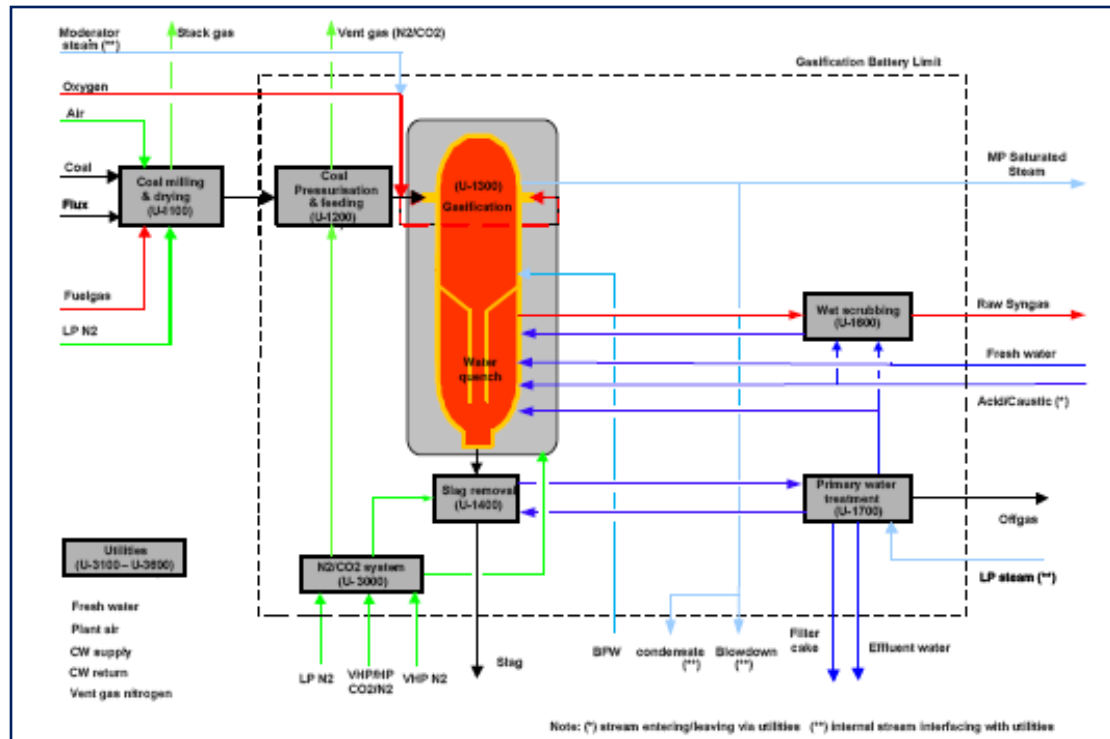
#### 3.3.1 Coal Gasification Unit (Shell)

##### 3.3.1.1 General Description

The process description of coal gasification has been presented through under mentioned self-explanatory diagram.

Figure 1.0

Coal Gasification Process



Coal shall be received from the coal yard by belt conveyor, milled and dried, in the Coal Milling and Drying (CMD) system and then fed, under pressure, to the coal burners of the Gasifier via the “Coal Pressurization and Feeding” (lock-hopper) system.

The coal will react in the Gasifier with the blast (steam-diluted oxygen) to form syngas and (fly) slag. The mixture of syngas, (fly) slag and any unreacted coal leaving the Gasifier at the bottom shall be quenched to about 200-210°C, in a dipleg quench. Thereby molten slag is quenched and scattered to small (on average approximately 2-5

mm) glassy granulates in the slag (water) bath. In addition, the finer slag particles (“slag fines”) will remain (floating) in the water and be removed as water/solids slurry.

The syngas from the water quench is passed through a venturi scrubber and packed-bed wet scrubber column to lower its solids content to (typically)  $<1 \text{ mg/Nm}^3$ . The wet scrubber also reduces the halide content in the syngas to  $\ll 1 \text{ ppmv}$ . It is further water-saturated and leaves the wet scrubbing system at a temperature of approximately  $206^\circ\text{C}$  to Battery Limit (B.L.).

The slag collected in the slag bath is discharged via a lock hopper system, separated from the water via a drag chain and transported to off-site via a conveyor belt. The heat absorbed in the slag bath is removed via a slag bath-water circulation loop with an external cooler.

In order to prevent build-up of trace components in the slag removal and wet scrubbing systems, both systems are provided with a water bleed. The slurry bleed from both systems is passed to the primary water treatment, in which the slurry is first flashed in two steps. The flashed gas is cooled and the water is knocked out after which the sour gas is sent to the Sulphur Recovery Unit (outside B.L.). The slurry is sent to a clarifier, settler and vacuum belt filter and may be recycled as wet cake to the raw coal storage facilities which after drying can be added to the feed to the coal mills.

### 3.3.2 Raw gas Purification Unit

The raw Gas from Gasification unit is further processed for producing Ammonia Synthesis gas. The main process sections, necessarily required for this are as follows:

- CO Shift
- Rectisol
  - Acid gas ( $\text{H}_2\text{S}$ ) removal
  - Acid gas ( $\text{CO}_2$ ) removal
- Sulfur Recovery
- Nitrogen Wash System

### 3.3.3 Ammonia Synthesis Section

The synthesis gas from  $\text{N}_2$  wash unit is compressed to a pressure of 140 atms in the synthesis gas compressor / re-circulator which is a centrifugal compressor. The last stage serves as a re-circulator & compresses the combined stream of makeup and recycles gas. The gas leaving the compressor/re-circulator is heated to the converter inlet temperature by heat exchange with the hot effluent gas.

In the ammonia synthesis converter, the synthesis gas is reacted to an ammonia concentration of 16.9% NH<sub>3</sub> and the gas leaves the converter at around 450°C.

A considerable part of the heat content of the converter effluent gas is recovered to produce HP steam, preheat BFW and make up synthesis gas from the compressor.

Finally the gas is condensed in the ammonia chillers and then the mixture of synthesis gas and liquid ammonia is passed on to the ammonia separator in which the ammonia is separated.

After separation, the recycle gas is heated in cold heat exchanger and sent to the recycle gas compressor. The liquid ammonia separated in ammonia separator, is depressurized and the liberated gases are separated in HP let down vessel. The HP let down gas is returned to the suction side of the synthesis gas compressor in order to recover the hydrogen content.

Liquid ammonia product from HP let down vessel is introduced to the top of the accumulator, where the main part of dissolved gases is released. Product ammonia is then pumped to storage.

### 3.3.4 Urea Plant

Like ammonia plant, urea plant also has many renowned technologies which are equally comparable with respect to plant cost and energy consumption. As the technology for the proposed project has not been finalized, for the proposed study, **Saipem's ammonia stripping process technology** has been considered for urea plant.

The description of various process steps involved in the production of urea are as follows:

- Urea synthesis and NH<sub>3</sub>, CO<sub>2</sub> recovery at high pressure
- Urea purification and NH<sub>3</sub>, CO<sub>2</sub> recovery at medium and low pressures
- Urea Concentration Section
- Urea Prilling Section

## 3.4 Raw Material & Utilities

### 3.4.1 Raw Material & Utility Consumption

The requirement of raw material and utilities for the proposed project has been worked out on the basis of rated capacity operation of the ammonia urea plants. The

requirements of various inputs for 2200 MTPD ammonia and 3850 MTPD urea plants are summarized in Table-3.2 below:

**Table-3.2**  
**Raw Material & Utility Requirement**

Raw Material/Utilities	Unit	Requirement
Coal		
(a) As Feed	MTPH	106.2
(b) As Fuel	MTPH	134.0
Pet Coke (Feed)	MTPH	38.5
Water	m <sup>3</sup> /hr	1437
Neem Oil	Kg/hr	56.15

### 3.5 Coal

Coal & Pet Coke are the raw materials used for this project. Coal is required for both as feedstock for gasification and as fuel for steam generation. Pet Coke shall be used for Coal Blending.

The ash content in the coal considered for the proposed project shall be around 34% for gasification and around 40% for power generation.

#### 3.5.1 Coal Availability

Raw coal requirement for the project would be around 3.5 to 4.5 million tonnes per year. The source of coal will be at a radius of about 10 km from the project site.

#### 3.5.2 Coal Requirement

The hourly coal requirement for use in the process as well as for steam generation are presented as below:

Coal (Feed)	:	106.2 MT
Pet Coke (Feed)	:	38.5 MT
Coal (Fuel)	:	134.0 MT

### 3.6 Water

The total requirement of raw water for the complex is envisaged to be around 1437 m<sup>3</sup>/hr. Water requirement will be made available from Brahmini River through existing pipeline network. Pre-treatment of raw water has been considered for process use.

### 3.7 Power & Steam

The steam and power required for the project would be captively generated.

#### 4.0 NEED OF THE PROJECT

Urea as a major source of Nitrogen continues to dominate the scene of Nitrogenous Fertilizers in the country.

#### 4.1 Production and Consumption Trends

Though the level of fertilizer consumption in the country has all along been very low, the indigenous production of urea in India has always been lagging behind the consumption requirement except for the year 2000-01.

**Table-4.1**

#### Gaps between Consumption & Production of Urea

(Lakhs Tonne)

Year	Consumption	Production	Gap	% of Gap to Consumption
1960-61	0.14	0.12	(-) 0.02	14.29
1970-71	11.78	10.96	(-) 0.82	6.96
1980-81	60.44	33.84	(-)26.60	44.01
1990-91	140.76	128.35	(-)12.41	8.82
2000-01	191.86	196.23	(+) 4.47	2.28
2005-06	222.95	200.85	(-)22.10	9.91
2006-07	233.38	203.10	(-)30.28	12.97
2007-08	259.63	198.60	(-)61.03	23.51
2008-09	266.49	199.22	(-)67.27	25.24
2009-10	266.73	211.12	(-)55.21	20.85
2010-11	281.13	218.72	(-)62.41	22.20
2011-12	295.65	219.92	(-)73.73	25.61
2012-13	300.02	225.86	(-)74.16	24.72
2013-14	304.54	227.18	(-)77.36	25.40
2014-15	306.10	225.93	(-) 80.17	26.19
2015-16	306.35	244.61	(-) 61.49	20.08

(-) deficit (+) surplus

It may be seen from the above table that gap increased from 0.82 Lakh MT in 1970-71 to 26.61 Lakh MT in 1980-81 and to 61.49 Lakh MT in 2015-16. Surplus availability of urea in the year 2000-01 has been due to decline in consumption on one hand and excess domestic availability particularly in view of high opening stock on the other.

## 4.2 Future Supply Estimates

### 4.2.1 Indigenous Existing Supply

To meet the domestic demand for urea, production from the existing units in the country stood at 244.61 Lakh MT during 2015-16. Almost 21 plants operated above 100 % capacity utilization. It is likely that the same trend shall be continued in the near future.

### 4.2.2 Additional Capacity

Around 12.70 Lakh MT of additional capacity of urea through green field project by Matrix Fertilizers & Chemicals at Panagarh (West Bengal) is under implementation and commercial production is likely to start in 2017-18.

### 4.2.3 Projected Demand-Supply Gap

Urea demand-supply scenario in India that is likely to emerge in FY18 to FY25 is shown in Table-4.2 and Figure 4.1.

**Table-4.2: Projected Demand Supply Gap for Urea in India**

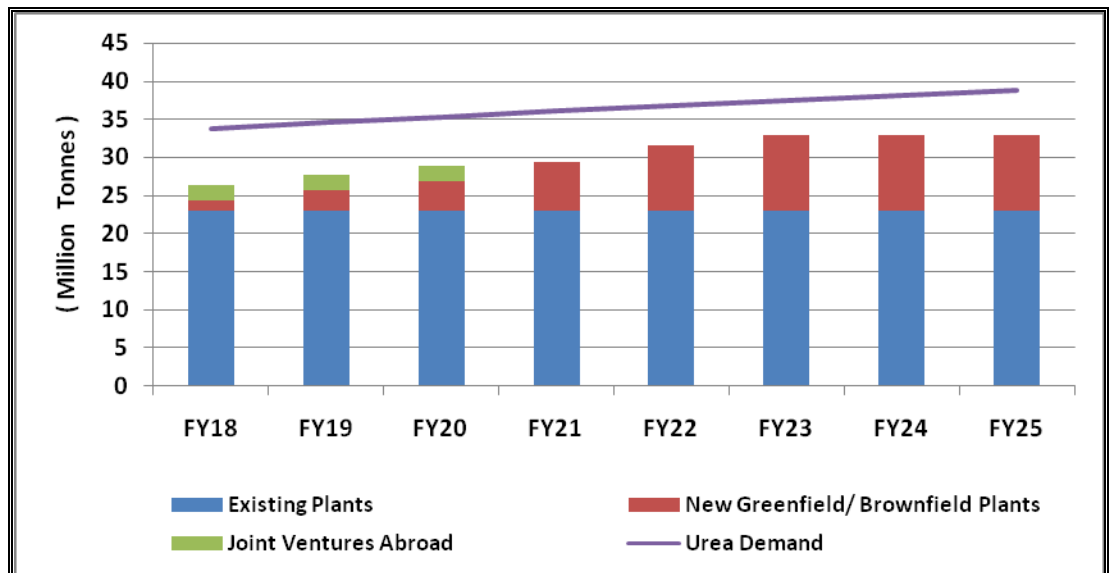
(million tonnes)

Year	Urea Demand	Supply Estimates				Demand Supply Gaps
		Existing Units	New Greenfield / Brownfield Plants	Joint Ventures Abroad	Total	
FY18	33.754	23.030	1.270	2.000	26.300	7.454
FY19	34.536	23.030	2.600	2.000	27.630	6.906
FY20	35.307	23.030	3.870	2.000	28.900	6.407
FY21	36.064	23.030	6.410	-	29.440	6.624
FY22	36.808	23.030	8.540	-	31.570	5.238
FY23	37.418	23.030	9.810	-	32.840	4.578
FY24	38.136	23.030	9.810	-	32.840	5.296
FY25	38.830	23.030	9.810	-	32.840	5.990

Source – PDIL Estimates

The projected deficit level of 6 million tonnes of urea in FY20 is based on certain assumptions on the demand as well as supply side. On the supply side, a critical assumption is that the existing installed capacity is not only retained in good working condition but is also able to maintain the high capacity utilization levels. The gas based plants commissioned in 1980's and thereafter would call for timely revamping and retrofitting to ensure that they are able to maintain present operating rates and low energy consumption.

Figure 4.1: Demand-Supply Scenario in India over the period FY18 to FY25



The wide gap between consumption and production of urea has to be fulfilled through higher imports. In the past, India has imported urea from various countries through ports located in the eastern and western coast of the country. In FY16, around 62% of total urea imports have been taken place through ports located on the west coast as shown in Table 4.3 below.

Table 4.3: Port - wise Urea Imports

(million tonnes)				
S.No.	West Coast Port	FY15	East Coast Port	FY15
1.	Hazira	0.383	Gangavaram	0.246
2.	Kandla	1.356	Kakinada	1.065
3.	Mundra	1.903	Karaikal	0.430
4.	Mangalore	0.317	Krishnapatnam	0.935
5.	Pipavav	1.431	Paradip	0.051
6.	-	-	Tuticorin	0.085
7.	-	-	Vizag.	0.491
8.	-	-	Chennai	0.056
	<b>West Coast Total</b>	<b>5.390</b>	<b>East Coast Total</b>	<b>3.359</b>

Source - Department of Fertilizers, Govt. of India

#### 4.2.4 Available Options

The apparent choice to fulfill this demand supply gap may be through increase in indigenous capacity by expansion/grass-root plants, by joint venture and import of urea.

#### 4.2.5 Expansion / Grass root plants

Around 1.27 million tonnes of additional capacity of urea through green field project of Matix Fertilizers & Chemicals at Panagarh (West Bengal) which is under implementation and commercial production of the plants is likely to start in FY18.

Over the period 2019 -2025, seven more projects are expected to start which are presently under active consideration by the management of the companies / the Govt. of India. These projects are Ramagundam Fertilizers & Chemicals at Ramagundam (Telangana), Chambal Fertilizers & Chemicals at Gadepan (Rajasthan), Rashtriya Chemicals & Fertilizers at Thal (Maharashtra) and FCIL at Sindri (Jharkhand) / FCIL (Gorakhpur) / HFCL (Barauni)/ BVFCL (Namrup).

#### 4.2.6 Joint Venture Abroad

Due to constraints in the domestic availability of natural gas for increasing the production of urea in the Country, the Government of India is encouraging Indian fertilizer companies to have joint venture projects with buy back arrangements in gas rich countries.

One Joint Venture Project by Oman India Fertilizer Company (OMIFCO) is already operating in Oman. OMIFCO, the joint venture company, will supply around 2 million tonnes of urea to Government of India under off-take agreement at fixed long term price upto the end of FY20.

Other JV Projects in pipeline are in the countries like Iran, Ghana and Nigeria, The progress of these projects is not very encouraging.

#### 4.2.7 Import

The quantity of urea available for international trade is limited. The analysis of past 15 years data reveal that increase and decrease in the world export supply or import demand by 10 million MT has led to violent fluctuations in the prices from US\$ 70 to US\$ 800 per MT of urea. This variation in prices is basically due to changes in the output by either 'low cost exporters' or 'swing producers' who account for about 6 million MT of world trade. Low cost producers are export oriented facilities based on low cost gas. Swing producers are primarily domestic suppliers who either (i) enter the export market when prices are high even ignoring domestic supplies, or (ii) stop even domestic supplies when prices are low. Manufacturers in free markets like USA fall under this category.

When the demand is strong, it is the demand-supply balance which would determine the price level that the market can sustain at that particular point of time. It has no relation to manufacturing costs.

When market is weak, it is the cost profiles of the producers and more specifically their cash costs which would determine the price levels. Low cost exporters do not normally reduce their export volumes and prefer to maximize sales volumes even when prices are dropping so long as they recover their cash costs. Generally, the swing producers have higher manufacturing costs and they would start exiting the market as prices drop, thereby reducing exports to balance the reduction in import demand and maintain prices.

It is apparent that urea is a strategic commodity and capacity of international market is rather limited to meet significant increases in demand. An additional demand of even 1-2 million MT would cause serious imbalance and prices would shoot up. Higher levels of demand could result in a situation when urea would not be available in spot markets at any price. Therefore, it would not be prudent to depend on imports for more than 5-6 Lakh MT of urea. This in other words means that the country shall be required to have in place additional domestic capacity of urea for indigenous consumption.

## 5.0 ENVIRONMENTAL CONSIDERATION

Though Talcher industrial area falls in the list of 88 industrial clusters identified for preparation of Comprehensive Environmental Pollution Index (CEPI). Necessary Management Plan has been prepared and being implemented with positive impact and it has been found that there is considerable reduction in CEPI index. It is also worth mentioning that the moratorium has been lifted in 2013. The proposed fertilizer plants are a new generation plant with best available technology and which has built-in pollution abatement system. The plants are based on optimum utilization of energy which will reduce pollution load.

## 6.0 EMPLOYMENT GENERATION

It is envisaged that the proposed project would generate sufficient employment opportunity during construction phase as well as operation basis. For carrying out construction related activities, it is envisaged to engage skilled, semi-skilled and unskilled workers from local area to the maximum extent.

### 6.1 Manpower Requirement

The proposed coal gasification based urea fertilizer complex is considered to be professionally managed by well-qualified, experienced and trained personnel. It is envisaged that the proposed plants and facilities would be headed by a Managing Director supported by Executive Director and General Managers. General managers will report to Executive Director (O&M) of the Complex.

Based on the organisational pattern envisaged for, the total number of operating personnel required to operate plant and storage facilities in three shifts a day at full rated capacity and other auxiliary / statutory facilities works out to 550 and broad break-up of this has been presented in Table-6.1.

**Table-6.1**

#### **Man Power Requirement**

Sl. No.	Department	Coal gasification / Ammonia	Urea	CPP, SGP & Off-site	Others
	Managing Director			1	
1.0	M.D. Office staff			3	
2.0	Executive Director (O&M)			1	
3.0	Secretary to ED (O&M) & staff			3	

Sl. No.	Department	Coal gasification / Ammonia	Urea	CPP, SGP & Off-site	Others
4.0	General Manager (Operation)	1			
5.0	Secretary to GM (O) & staff	3			
6.0	General Manager (Maintenance)	1			
7.0	Secretary to GM (M) & staff	3			
	<b>Sub-Total (1 to 8)</b>	<b>16</b>			
8.0	Dy G M (Operation)	1			
9.0	Dy G M (opr- office)	2			
10.0	Dy G M (Maint)	1			
11.0	Dy G M (Maint off.)	2			
12.0	Dy G M (Finance & Administration)	1			
13.0	Dy G M (F & A) off	2			
14.0	Sr. Managers (O&M,T/S)	4			
	<b>Sub- Total(9 to 15)</b>	<b>13</b>			
15.0	Manager (O &M)	2	1	1	4
16.0	Shift-in-charge (O&M)	12	8	12	20
17.0	Chemist	8	3	2	5
18.0	Operators & Foreman	68	36	36	10
19.0	Technician(M/M) G/s +Shift	28	14	14	15
20.0	Technician (E/M) G/s +Shift	12	6	7	6
21.0	Technician (I/M) G/s +Shift	12	6	6	6
22.0	Helpers operation	16	7	4	-
23.0	Helpers maintenance	12	8	8	2
	<b>Sub Total (16 to 24)</b>	<b>170</b>	<b>87</b>	<b>90</b>	<b>68</b>
	<b>Sub total (1-24)</b>	<b>170</b>	<b>87</b>	<b>90</b>	<b>97</b>
	<b>Total (1-24)</b>	<b>444</b>			
<b>25</b>	Finance/TS & Others	<b>106</b>			
	<b>Grand Total (1 to 25)</b>	<b>550</b>			

- 6.2** The manpower requirement has been developed considering the use of Microprocessor based Digital Control System and actual manpower working in the plants. Advanced process control using on-line computer control for optimization of process parameters finds increasing application in this type of chemical complex for improved plant operation and maintenance and consequently draws the benefits of lower manpower. The system enables a more stable process operation and better energy efficiency by continuous on-line process optimisation.

## **7.0 REHABILITATION & RESETTLEMENT PLAN**

Old & closed FCIL Talcher fertilizer complex is spread over an area of 904.53 acres of land. The total area of land is under the administrative possession of FCIL Talcher. The proposed fertilizer project shall be implemented within plant premises of existing Talcher Fertilizer Complex. Hence, any planning with respect to rehabilitation & resettlement is not applicable.

## 8.0 PROJECT SCHEDULE & PROJECT FINANCIALS

### 8.1 Project Schedule

The likely date of start of construction shall commence after getting Environmental Clearance (EC) from MoEF&CC. The project is scheduled to be completed within 42 months after financial closure.

### 8.2 Cost Estimates

The Project Capital Cost of the proposed project 2200 MTPD ammonia and 3850 MTPD neem coated urea along with associated offsite & utility facilities, as per the scope is estimated at Rs. 788700 Lakh. Details of the estimated capital requirement are as under in Table-8.1.

**Table-8.1**  
**Project Capital Cost Estimates**

Sl. No.	Item	Amount (Rs. Lakhs)
<b>1.0</b>	<b>Main Plants</b>	
1.1	Coal Preparation/Blending	7466
1.2	Air Separation Unit	47934
1.3	Gasification Incl. Purification	175505
1.4	Ammonia Synthesis	74537
1.5	Ash Handling System	15079
1.6	Urea Plant	75560
<b>2.0</b>	<b>Off-site facilities incl. spares</b>	
2.1	Steam Generation & CPP	100244
2.2	Other Off –Site Facilities	90730
3.0	Spares	23489
4.0	Project Management Charges	17243
5.0	Engineering Fees	38940
6.0	Non-plant Buildings	6000
7.0	Renovation of Township	6500
8.0	Land & Land Development	11002
9.0	Working Capital Margin	17011
10.0	Contingency	34512
11.0	Net Commissioning Expenses	3500
12.0	Interest During Construction	43474
	<b>Total Project Cost</b>	<b>788726</b>

### 8.3 Project Cost

The total cost of the above proposed project has been estimated as Rs. 788700 Lacs and it is expected to be completed within 42 months after environmental clearance.

## 9.0 ANALYSIS OF PROPOSAL

The final analysis of proposed may be briefed as under:

- a) The revival of FCIL Talcher will narrow the gap between demand and supply of Urea in central and eastern zone of India, especially in Bhubaneswar area.
- b) Industrial clusture of talcher has been identified as critically polluted zone but implementation of Management Plan prepared by CPCB/OSPCB has resulted positive impact with reduction in CEPI index. As a result the moratorium on Talcher Industrial Area has been lifted in 2013. Lifting of moratorium has enhanced the potential of further industrial development within Talcher Industrial Area.
- c) The implementation of recently developed Best Available Technology (BAT) which is a reliable and reproducible in different environment throughout the globe, will save energy consumption for production of ammonia / neem coated urea.
- d) The new technology will reduce dependency of import of fertilizer in the country thereby resulting in saving of foreign exchange.
- e) The proposed project is a part of “*India Low Carbon Strategy*” and INTENDED NATIONALLY DETERMINED CONTRIBUTION (INDC) under UNEPCCC Protocol.
- f) The policy for revival of FCIL Talcher in the name of Talcher Fertilizers Limited (TFL) is the result of restless efforts of GOI to bridge up the gap between demand and supply of fertilizer in the country. Several policies framed and implemented from time to time under strict close observation of DoF and Niti Ayog and PMO.

## 10.0 COST OF PRODUCTION

### 10.1 Capacity and Level of Production

The capacities of ammonia and urea plants in the proposed project have been considered as 2200 MTPD and 3850 MTPD respectively. The conversion of total ammonia to urea will result in production of about 3850 MTPD urea; there will not be any surplus ammonia. The cost of production of urea has been worked out assuming operation at rated capacity and 330 days annual on stream efficiency. The annual production of neem coated urea on these assumptions will be 12.70 Lakh MT, which is considered as the rated capacity of the plant. Annual productions at lower capacity utilization are based on percentage of annual rated capacity.

### 10.2 Cost of Production

The cost of production of Neem coated urea has been worked out at 95% and the rated production (100%) levels and presented below:

**Table-10.2**

**Cost of Production of Neem Coated Urea**

Sl.No.	Level of Production	COP of Urea (Rs./MT)
1.0	100% level	15802
2.0	95% level	<b>16280</b>
3.0	80% level	18084

## 11.0 CONCLUSION

Based on the facts mentioned above, the proposed project proposal for revival of FCIL Talcher requires and deserves due diligence for sincere consideration on priority basis for implementation of project in time.

**ADDENDUM TO THE JOINT VENTURE/SHAREHOLDERS'  
AGREEMENT**

**DATED OCTOBER 27, 2015**

**("ADDENDUM")**

**BY AND AMONGST**

**GAIL (INDIA) LIMITED**

**AND**

**FERTILIZER CORPORATION OF INDIA LIMITED**

**AND**

**RASHTRIYA CHEMICALS AND FERTILIZERS LIMITED**

**AND**

**COAL INDIA LIMITED**

**DATED 13<sup>TH</sup> FEBRUARY, 2017**



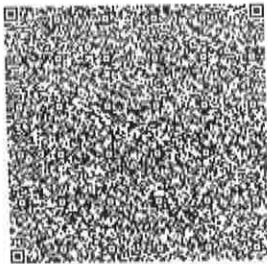
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## INDIA NON JUDICIAL

Government of National Capital Territory of Delhi

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Account Reference	: IMPACC (PF)/ dl907913/ DELHI/ DL-DLH
Unique Doc. Reference	: SUBIN-DL90791378013014908780P
Purchased by	: RCF LIMITED AND OTHERS
Description of Document	: Article 5 General Agreement
Property Description	: Not Applicable
Consideration Price (Rs.)	: 0 (Zero)
First Party	: RCF LIMITED AND OTHERS
Second Party	: Not Applicable
Stamp Duty Paid By	: RCF LIMITED AND OTHERS
Stamp Duty Amount(Rs.)	: 100 (One Hundred only)



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### ADDENDUM TO THE JOINT VENTURE/SHAREHOLDERERS' AGREEMENT DATED OCTOBER 27, 2015

This ADDENDUM to the Joint Venture Agreement dated 27<sup>th</sup> October, 2015 executed into as on this 13<sup>th</sup> day of February 2017 at New Delhi.

BY AND AMONGST

Rashtriya Chemicals and Fertilizers Limited, a company incorporated under the Companies Act, 1956 and having its Registered Office at Priyadarshini, Eastern

#### Statutory Alert:

1. The authenticity of this Stamp Certificate should be verified at "www.shcilestamp.com". Any discrepancy in the details on this Certificate and as available on the website renders it invalid.
2. The onus of checking the legitimacy is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.

Express Highway, Sion, Mumbai 400 022, Maharashtra (hereinafter referred to as "RCF" which expression unless repugnant to the context or meaning hereof includes its successors, administrators or permitted assignees) of the **First Part**.

**AND**

**Coal India Limited (CIL)**, a company incorporated under the Companies Act, 1956 and having its registered office at Coal Bhawan, Premises No. 4, MAR, Newtown, Rajarhat, Kolkata-700 156, West Bengal (hereinafter referred to as "CIL", which expression unless repugnant to the context or meaning hereof includes its successors, administrators or permitted assignees) of the **Second Part**.

**AND**

**GAIL (India) Limited**, a company incorporated under the Companies Act, 1956 (No.1 of 1956) and having its registered office at GAIL Bhawan, 16 Bhikaiji Cama Place, R.K. Puram, Ring Road, New Delhi-110066 (hereinafter referred to as "GAIL", which expression unless repugnant to the context or meaning hereof includes its successors, administrators or permitted assignees) of the **Third Part**.

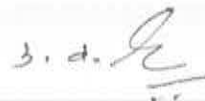
**AND**

**Fertilizer Corporation of India Limited**, a company incorporated under the Companies Act, 1956 and having its registered office at 7, Institutional Area, SCOPE Complex, Core III, Lodhi Road, New Delhi-110003, (hereinafter referred to as "FCIL" which expression unless repugnant to the context or meaning hereof includes its successors, administrators or permitted assignees); of the **Fourth Part**.

(GAIL, RCF, CIL and FCIL are hereinafter individually referred to as a "**Party**" and collectively as the "**Parties**").

WHEREAS the Parties hereto had entered into a Joint Venture Agreement dated 27<sup>th</sup> October, 2015 (hereinafter referred to as the JV Agreement).

AND WHEREAS subsequent to the execution of the said JV Agreement there have been further discussions and deliberations between the Parties hereto.



AND WHEREAS the Parties have further agreed that all other terms and conditions of the JV Agreement save and except the terms as recorded herein will remain subsisting, binding, effective, enforceable and in force between the parties.

**NOW THE PARTIES HERE BY AGREE TO GRANT THE FOLLOWING:**

**1. NAME OF THE COMPANY**

Name of the "Company or JV" is changed to "TALCHER FERTILIZERS LIMITED" in place of "Rashtriya Coal Gas Fertilizers Limited."

**2. SHAREHOLDING**

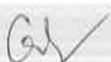
Clause 4.3 (a) is amended and now be read as under:

Notwithstanding any equity subscription and the shareholding percentage of the Parties/Promoters during the setting up period of the project, the shareholding of the Company, upon formation of JV Company, shall be in the following proportion:

I.	RCF	: 29.67%
II.	CIL	: 29.67%
III.	GAIL	: 29.67%
IV.	FCIL	: 10.99%

Parties agree that the shareholding of FCIL in the Company is subject to change depending on valuation of assets transferred by FCIL to the Company as FCIL does not intend to provide any equity in the Company beyond the transfer of Talcher assets and the Initial Subscription of shares as Stated in Clause 3.1 (v) and Clause 4.2 (d) respectively. If due to above, the shareholding of FCIL gets reduced below 10.99%, then Parties shall meet and discuss to contribute such reduction so that the overall 100% shareholding is with Public Sector Companies. In case the asset value is ascertained to be higher, FCIL shareholding may also be higher than 10.99%. In that case RCF, CIL and GAIL shareholding will be reduced in equal proportion.

The equity percentage as mentioned above shall also be inclusive of the Shares held by the Affiliates of respective Parties. The parties shall have a right to increase/decrease their respective shareholding after the lock-in period.



### 3. FINANCING

- I. Clause 5 (f) of the JV agreement is amended and now be read as under:

If however, the implementation of the JV is abandoned by mutual consent or for reasons beyond the control of the Parties/ Promoters, the expenditures ("Pre-Project Activities) as above shall be absorbed by GAIL, RCF & CIL in equal proportion, to make upto 100% contribution.

- II. Clause 5 (h) of the JV agreement is amended and now be read as under:

All promoters (except FCIL) shall continue to pay the cash call raised by JVC in the proportion of Shareholding to make upto 100% contribution.

### 4. ROLE OF PARTIES

- I. Clause 6.1 of the JV agreement is amended and replaced with the following sub clause:

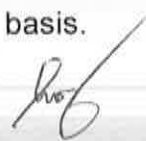
Subject to any applicable laws, each of the Parties undertakes to the other that it shall ensure:

The quorum for General meetings shall consist of 5 members provided that at least one representative of each GAIL, RCF, CIL and FCIL is present.

Each of its representatives and proxies at General Meetings of the Shareholders shall on demand of poll exercise its votes. Nominated Directors (or alternate Directors), at Board Meetings and otherwise, act so as to comply with, and fully and effectually implement, the spirit, intent and specific provisions of this Agreement;

- II. Clause 6.9 added as below:

- a) The Company shall offer to market its product Urea through RCF at an arm's length basis.
- b) The Company shall first offer its by-products to RCF/CIL/GAIL individually/collectively at an arm's length basis.



3.1.12  


## 5. COMPOSITION OF THE BOARD

Clause 7.1(a) of the JV agreement is amended and now be read as under:

Until otherwise determined by the Company in General Meeting and subject to the provisions of the Act, as may be applicable to the Company, the number of Directors at any given point of time shall not be less than Seven (7) and more than 15 (Fifteen).

## 6. APPOINTMENT OF DIRECTORS

- I. Clause 7.2 (b) of the JV agreement is amended and replaced with the following sub clause:

In addition to the nominee Directors, the Board may appoint such number of Independent Directors as may be required to be appointed under the Act.

The Board of the Company shall be of seven (7) Directors, two (2) each shall be nominated by CIL, GAIL and RCF and one (1) shall be nominated by the FCIL. Out of 7 Directors, the Company will have three (3) whole time Directors, namely Director (Operations), Director (Finance) and Managing Director (MD) who will exercise powers subject to the superintendence, control and direction of the Board of Directors. GAIL would appoint the first MD, CIL will nominate the first Director (Finance) and RCF will nominate the first Director (Operations). MD and whole time Directors shall be appointed for a period of three years on rotation. The manner of rotation of MD and Directors shall be decided by GAIL, RCF & CIL.

However, initially Chief Executive Officer(CEO) shall be appointed by GAIL and as the project progresses, the Board of TFL will decide at an appropriate time to appoint a Managing Director and to induct other whole time Directors. Board of TFL will decide whether CEO will be a board member or not.

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RCF

CIL

3.1.12

- II. Clause 7.2 (c) of the JV agreement is deleted:
- III. Clause 7.2(e) of the JV agreement is amended and now be read as under:  
Subject to the provisions of the Act, further change in the number of Directors of the Company shall be in proportion to the equity share holding of the Promoters. However, Promoter(s) shall always have the right to appoint one nominee Director on the Board of the JV as long as their shareholding in JV is not zero.

## 7. CHAIRMAN OF THE BOARD

Clause 7.7 (a) of the JV agreement is amended and now be read as under:

CIL, GAIL and RCF shall have the right to nominate any one of the Directors nominated by them as the Chairman of the Board for alternate periods of three years. The first Chairman of the Company shall be nominated by RCF. The Chairman will continue to hold office after completion of each three-year period till a new Chairman is nominated by CIL, GAIL and RCF. The next Chairman of the Board shall be as decided amongst CIL, GAIL& RCF.

## 8. QUORUM

- I. Clause 7.8 (a) of the JV agreement is amended and now be read as under:

The quorum for a meeting of the Board of Directors shall be one third of the strength of the Board or three, whichever is higher, with the presence of at least one Director each nominated by RCF, CIL, GAIL.

- II. Clause 7.8 (c) of the JV agreement is amended and now be read as under:

At a meeting adjourned in accordance with Section (b) above, the quorum shall be one third of the strength of the Board or three whichever is higher and only the unfinished business of the original meeting shall be transacted excluding the matters reserved for affirmative vote pursuant to clause 9 hereinafter.

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## 9. CONSTITUTION OF COMMITTEES BY THE BOARD

Clause 7.11 (a) of the JV agreement is amended and now be read as under:

The Board may, from time to time, by passing a resolution, constitute committee(s) of the Directors of the Company. The committee(s) so formed shall consist of at least one Director nominated by each of RCF, GAIL and CIL.

## 10. MANAGEMENT

The Clause 8.2 of the JV Agreement is amended and replaced with the following sub clause:

The CEO/MD shall carry out the day-to-day operation of JV in accordance with the objectives laid down by the Board. The responsibilities of the CEO/MD shall include, without limitation, general control over all functions of the JV including administration, marketing, finance, manufacturing and technology of the JV.

Chief Operating Officers (COO)s for Mining, Gasification/Upstream and Downstream would be appointed and would report to Director(Operations). COO(Mining) would be nominated by CIL, COO(Gasification/Upstream) would be nominated by GAIL & COO(Downstream) would be nominated by RCF. The COOs will work under guidelines and powers delegated by the Board. COOs will be Project Heads (Mining/Gasification/Downstream) till commissioning of the Project. Thereafter, they will be In-charge of Operation and Maintenance (O&M) of respective areas.

A Chief Finance Officer (CFO) would be appointed to oversee all financial matters of the Company and shall report to CEO/MD. The CFO will work under the guidelines and powers delegated by the Board and shall be an Invitee to all Board meetings of the Company. On appointment of whole-time Directors, the Director (Finance) will be the CFO. The appointment of CFO shall on rotation by CIL, RCF & GAIL every three years. The first CFO would be nominated by CIL. The manner of rotation of CFO shall be decided by RCF, CIL & GAIL.



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Page | 7

## 11. BUSINESS NEEDING AFFIRMATIVE APPROVAL

- (i) **Clause 9.1 of the JVA be modified to the extent as mentioned hereinafter:**

All questions arising in meeting of the Board shall be decided by majority of Directors present and voting, provided, however that in respect of the matters stated in clause 9.1 of the JVA, no resolution shall be passed or decision taken at a meeting of the Board unless it has the affirmative vote of at least One Director from each of CIL, GAIL, FCIL and RCF or their alternate Directors, as the case may be.

- (ii) **Clause 9.1 of the JVA be amended so as to include the following in the list of reserved matters:**

"Fixation of the value of assets transferred by FCIL to the JV to arrive at value of FCIL's equity contribution in the JV

## 12. OBLIGATION UNDER THE AGREEMENT

Clause 10.1 (a) of the JV agreement is amended and now be read as under:

Resolution of the Board and the general body meetings of JV approving the Memorandum and Articles of Association of JV, incorporating the salient features of this Agreement.

## 13. TRANSFER AND ENCUMBERANCE OF SHARES

- I. The Clause 11.4 of the JV agreement is replaced with the following sub clause:

JV shall at all times remain a Public Limited Company as defined in the Act with more than 74% shareholding by Government Companies/ Public Sector Undertakings. In the event RCF, CIL, FCIL and/or GAIL offload its equity share capital, after the lock in period as afore-stated in Clause 11.1, shareholding of either RCF, CIL, FCIL and/or GAIL shall only be transferred to another Government Company/ Public Sector Undertaking/FIs/ Private Sector. However in any case, shareholding by Government Company/ Public

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Sector Companies shall be more than 74% or minimum required for Coal Block allocated for the project, whichever is applicable.


II. The Clause 11.5 of the JV agreement is deleted.

IN WITNESS WHEREOF THE PARTIES/ PROMOTERS THROUGH THEIR AUTHORISED REPRESENTATIVES HAVE SET THEIR HANDS ON THE DAY, MONTH AND YEAR FIRST ABOVE WRITTEN.


For GAIL (India) Ltd.

For Fertilizer Corporation of India Ltd.

  
13/2/17  
(Authorized Signatory)

  
13/2/2017  
(Authorized Signatory)  
(Dr. Kavitha Gotru)  
Director (Finance)  
The Fertilizer Corporation of India  
7, Institutional Area,  
SCOPE Complex, Core III  
Palam Road, New Delhi-110015

For Rashtriya Chemicals and Fertilizers Ltd. For Coal India Ltd.

  
13/2/17  
(Authorized Signatory)

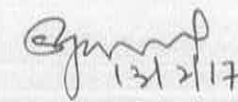
  
13/2/17  
(Authorized Signatory)

Witness:

**T. Bandopadhyay**  
General Manager (Coal Videsh)  
Coal India Limited  
New T. ... Kolkata-700156

Witness:

  
13/2/17  
(PRANITA ROY)

  
13/2/17  
(SANJAY ANAND)