

**EXECUTIVE SUMMARY
OF
ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT
for
EXPANSION OF EXISTING & ADDITION OF NEW
EXPLOSIVE PRODUCTS**

(ToR Letter No. F.No.IA-J-11011/360/2018-IA.II(I), dated 03 Dec, 2018)

Project Proponent



M/s KELTECH ENERGIES LIMITED

At

**Village Garamsur, Post Dudhala, Tehsil Katol, District
Nagpur- 441103, Maharashtra.**

Environmental Consultant



**QCI-NABET Accredited EIA Consultant for Synthetic Organic Industries (Sector 21) and Isolated Storage (Sector 28)
MoEF&CC (GOI) and NABL Recognized Laboratory
ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007**

Lab. & Consultancy: FP-34, 35, Food Park,
MIDC, Butibori, Nagpur – 441122
Mob.: +91-9372960077

Email: info@anacon.in, ngp@anacon.in

Website: www.anaconlaboratories.com

Report No. ANqr /PD/20A/2018/113

[CATEGORY: A, SCHEDULE: 5 (f) and 6(b)]

FEBRUARY 2019



1.0 INTRODUCTION

KEL was incorporated in the year 1977 by the Chowgule Group a flagship companies, Goa. One of the business vertical is manufacture of industrial explosive located in various parts of the country, for catering to the needs of mining and construction industry.

The first cartridge manufacturing unit of the Company located at Vishwasnagar, Tehsil Karkala, Udupi Karnataka was commissioned in the year 1980 with DuPont Watergel Technology. M/s. DuPont de Nemores Inc. USA, who were in explosives business since 1804 and who were world leaders in explosives technology were identified as technical collaborators.

Subsequently other manufacturing Units were established, in the year 1999 Garamsur unit near Nagpur (Maharashtra) was established where proposed expansion is planned.

The Unit has the existing facilities to manufacture: Slurry and Emulsion explosives, PETN, Detonating Fuse, Cast Booster and Perlite. It is an ISO system being maintained i.e. ISO 9001-2015 for Quality management, ISO 14001-2004 for Environment management and ISO 18001-2008 OHSAS certified Unit.

Efforts in brief made towards technology absorption, adaptation & innovation: KEL have indigenously developed emulsion explosives and made necessary improvements in SOP considering top priority in field requirements, complying relevant applicable acts. KEL is self-reliant in technology development and product innovation for manufacture and supply of emulsion explosives.

1.1 IDENTIFICATION OF PROJECT

Based on the existing Industrial licensed capacities of PETN is 600 MT/Annum, company has further approached to DIPP, Govt. of India for enhancement of capacity of PETN by 1000 MTPA and mono methyl amine nitrate.

The capacity enhancement has also been planned for Slurry /Emulsion Explosives 45000 MTPA, PETN 1600 MTPA. The Company has also planned to setup SME plant of capacity 20000 MTPA. Also planning to put Detonator plant for which it has DIPP license.

1.1.1 Nature of the Project

The existing products before expansion do not fall under the purview of the EIA Notification '2006 and subsequent amendments with respect to its capacity to produce various explosive products. However, KEL has regularly obtained valid consents; CTE/CTO required from MPCB.

Now, expansion of existing & addition of new explosive products activity is falling under schedule 5(f) and 6(b) category "A" of EIA notification 2006 and prior environment clearance is needs to be obtained from MoEF&CC, GOI.

1.1.2 Size of the Project

The details of existing and proposed expansion production/generation and storage capacity are shown in **Table 1 & 2.**

**TABLE 1
EXISTING AND PROPOSED EXPANSION PRODUCTION DETAILS**

PROPOSED PRODUCTS REQUIRING EC			
Sl. No.	Product ⁽²⁾	5(f) Maximum Quantity	6(b) Maximum Quantity ⁽¹⁾
1.	PETN	1,600 MTPA	200 MT at any time
2.	Lead Styphanate	5 MTPA	0.005 MT at any time
3.	Lead Azide	12 MTPA	0.005 MT (at Max. Annual qty)



PROPOSED PRODUCTS REQUIRING EC

Sl. No.	Product ⁽²⁾	5(f) Maximum Quantity	6(b) Maximum Quantity ⁽¹⁾	
			any given time)	handled 12 MTPA
4.	Mono Methyl amine nitrate (MMAN)	5000 MTPA	-	
5.	TNT (purchased – only storage at site)	-	60 MT at any time	Max. Annual qty handled 100MTPA
6.	Ammonium nitrate (purchased – only storage at site)	-	1200 MT at any time	Max. Annual qty handled 100,000 MTPA
7.	Mono Methyl amine (purchased – only storage at site)	-	48 MT at any time	Max. Annual qty handled 15000 MTPA
8.	LPG /CNG (purchased – only storage at site)	-	48 MT at any time	Max. Annual qty handled 15000 MTPA

⁽¹⁾Refer schedule II & III of MSIHC Rules 1989 amended 2000

⁽²⁾As is or in form of compounded products-hetero-mixed stabilized formulations (physical mixing as per explosive standard)

DIPP license attached as **Annexure XVI**.

Sr.no.	Proposed product not required EC	Maximum Quantity	DIPP license
1.	SME Bulk	20,000 MTPA	20,000 MTPA
2.	Slurry/ Emulsion	45000 MTPA	45000 MTPA
3.	Detonators	150 million Nos.	150 million Nos.
a	Shock tube	50 million meters	
b	Delay Elements	50 million Nos.	
4.	Detonating Fuse	50 Million Meters	50 Million Meters
5.	Cast Booster	200MTPA	200 MTPA
6.	Expanded Perlite	10 MT/day	NA

**TABLE 2
EXISTING AND PROPOSED STORAGE DETAILS OF PRODUCTS**

Existing and proposed storage details of products			
Storage explosive Products	Existing capacity	Proposed Expansion	Total Capacity after Expansion
Slurry & Emulsion	195 MT at any time	220 MT at any time	415 MT at any time
PETN/DF/ Cast Booster	60 MT at any time	140 MT at any time	200 MT at any time
HSD	20 KL at any time	--	20 KL at any time
Ammonium Nitrate	600 MT at any time	600 MT at any time	1200 MT at any time
TNT	7 MT at anytime	53 MT at any Time	60 MT at any time
SME	-	40 MT at any time	40 MT at any time
Mono Methyl amine	-	48 MT at any time	Max. Annual qty handled 15000 MTPA
LPG /CNG	-	48 MT at any time	Max. Annual qty handled 15000 MTPA
Styphnic acid	-	2 MT at any time	Max. annual qty handled 10 MTPA

*At any time quantity as per schedule II & III of MSIHC Rules 1989 amended 2000

Sr.no.	Existing products	Maximum Quantity	DIPP license
1.	Slurry/ Emulsion	20000 MTPA	20000 MTPA
2.	PETN	350 MTPA	600 MTPA
3.	Detonating Fuse	25 Million Meters	50 Million Meters
4.	Cast Booster	200 MTPA	200 MTPA
5.	Detonators	150 Million Nos.	150 Million Nos.



EIA- EMP study for Expansion of existing & addition of new explosive products at Village Garamsur, Post Dudhala, Tehsil Katol, District Nagpur-441103, Maharashtra.
M/s Keltech Energies Limited



Sr.no.	Existing products	Maximum Quantity	DIPP license
6.	Expanded Perlite	10 MT/day	NA

1.1.3 Location of the Project

The proposed expansion project area located within the existing plant at Village Garamsur, Post Dudhala, **Survey No.** 146,147,148/1, 149/1, 149/2, 151/1, 151/2, 152/2/2, 153, 154/1, 154/2, 155, 156/ 157, 158/1, 164, 165, 158/2, **Tehsil - Katol, District- Nagpur-441103, Maharashtra (Land Documents Annexure II & Local body NOC Annexure III).** The project site lies at the **Latitude:** 21⁰09'16.40" N, and **Longitude:** 78⁰44'18.27 E on the Topo sheet No. 55k_12, 55k_16 are shown in the **Figures 1.1 to 1.3.**

1.2 JUSTIFICATION AND NEED OF PROJECT

M/s. KEL has setup manufacturing facilities for production of various types of explosives. Based upon its past performance and indigenous capability.

The project is located in industrially backward district classified as Group D+ by the Government of Maharashtra, and is among the largest employer in the region providing direct and indirect employment to people.

1.2.1 Regulatory Framework

The project is not located in notified industrial zone so it is categorized as Category-A project. The proposed expansion will be within existing land area of 113.72 Acres (46.04 Ha.) (No additional land acquisition). The project is falling under schedule 5(f) and Schedule 6(b) of EIA Notification, 2006 and prior Environment Clearance needs to be obtained from MoEF&CC (EAC Industry -2)., GOI. KEL has therefore initiated the process of Environmental Clearance. Project status is as follows:

Description of Process	Date
ToR Application submitted at MoEF&CC	26 th October 2018
Additional information submitted to MOEF&CC	5 th November 2018
Standard TOR issued by EAC,MOEF & CC New Delhi	3 December 2018

The EIA report for the expansion of existing and addition of new explosive products is prepared based on the approved ToR by EAC, MOEF & CC, New Delhi, and will be submitted for grant a prior environmental clearance.

1.2.2 Cost of the Project

Garamsur, Nagpur total project cost after expansion (existing + proposed) is Rs. 63.17 crores. (Including existing Rs. 13.57 Cr.+ Proposed 50.6 Cr).

2.0 PROJECT DESCRIPTION

2.1 PROCESS DESCRIPTION OF PROPOSED PRODUCT

The process for manufacturing as and know how about explosives manufacturing are available with the company as given in EIA report Chapter 2.

2.2 DETAILS ABOUT RESOURCES

2.2.1 Raw Materials

Source: All the raw materials are available from indigenous sources. Proposed raw materials will also be received by road transport from adjoining destinations of Maharashtra, Gujarat, TN, Haryana, Rajasthan, Odisha etc.



2.2.2 Land Requirement

The core zone includes Industrial area of 113.72 Acres (46.04 Ha.) land of KEL and 10 km radius from M/s KEL Explosives Industrial Unit (land documents **Annexure II**).

The proposed project area located at Village Village Garamsur, Post Dudhala, Tehsil Katol, District Nagpur-441103, Maharashtra.

2.2.3 Power Requirement and Supply

The industry has obtained contract demand for 500 KVA. Proposed additional power requirement: 500KVA. Total power requirement after expansion: 1000 KVA.

Sr. no.	Existing	Proposed addition	Total after expansion
1.	500	500	1000

(Source - Dedicated grid supply - approval Letter issued by MSEDCL- **Annexure X**)

DG sets with capacity(KVA)		
Existing	Proposed addition	Total after expansion
1x200 + 1x500	1x500	1200

In normal operating condition DG sets will be on standby mode only.

Fuel

The fuel HSD/LPG/CNG is sufficiently available domestically. The process of steam generation boilers is based on agro based briquettes, which is procured from nearby areas.

2.2.4 Water Availability and Wastewater Generation

The daily water requirement for the existing explosive Industrial Unit is 16.5 KLD. KEL obtained NOC from CGWA for 16.5 KLD for ground water extraction (**Annexure IX**). Water is being sourced from two existing bore-well within plant area. The proposed expansion is requires about 63.5 KLD of water.

Wastewater Generation

Total treated wastewater via ETP (The capacity of existing ETP =60 KLD, Total capacity of ETP after expansion 60 KLD) 23 KLD will be recycled in the process whereas treated sewage 10 KLD will be used for development of green belt.

For disposal of domestic waste water KEL has installed septic tank followed by soak pit for 7m³/day capacity. Outlet of soak pit is used for gardening and irrigation within plant premises. After proposed expansion the entire domestic waste water will be collected at one point and sewage treatment plant is proposed with constructed wet land technology for treatment of sewage waste water of factory premises. The proposed STP capacity will be 15 m³/day.

Zero liquid discharge (ZLD) is maintained by plant.

2.2.5 Manpower Requirement

M/s. KEL is presently employing 164 people and proposed expansion additional 90 direct manpower will be employed. Total after expansion manpower requirement will be 254. Since the proposed plant is located in Nagpur district where trained manpower is available, employment will be given mostly to local people.

3.0 DESCRIPTION OF ENVIRONMENT

An environmental baseline monitoring was carried out as a part of EIA studies during **Post monsoon season (Oct 18 to Dec 18)** along with secondary data. This chapter of the report provides an



overview of the environmental baseline conditions of the 10 km radial distance from the project site.

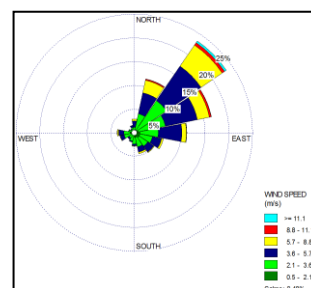
3.1 AIR ENVIRONMENT

3.1.1 Meteorology

Summary of the Meteorological Data Generated At Site (Oct. 2018 to Dec 2018)

Month	Temperature (°C)		Relative Humidity (%)		Rainfall Monthly Total (mm)
	Min	Max	Min	Max	
Oct 2018	21	35	27	81	0
Nov 2018	18	33	22	76	0
Dec 2018	13	30	18	85	16.7
Range	13-35		18-81		Total=16.7

Predominant Wind Direction	Post monsoon season
First Predominant Wind Direction	NE (23.43 %)
Second Predominant Wind Direction	ESE (16.63 %)
Calm conditions (%)	0.48
Avg. Wind Speed (m/s)	3.88



Wind-Roses (Postmonsoon-2018)

3.1.2 Baseline Data

The status of ambient air quality within 10 km study area was monitored for post-monsoon season 2018 for at 8 locations covering project site, Dhankuda, Garamsur, Sekapur, Ringnabodi, Bazargaon, Panjra, Mhasala. The locations were identified keeping in view predominant wind directions prevailing during study period, sensitive receptors and human settlements. The levels of PM₁₀, PM_{2.5}, Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Carbon monoxide (CO), Volatile Organic Compounds (VOCs), and Ammonia (NH₃), Ozone (O₃) were monitored as per MOEF&CC/CPCB guideline moreover the selection of parameters are based on the process emission likely to be emitted and its impact on air matrix.

The details of Ambient Air Quality Monitoring Results are summarized and given in **Table 3**.

TABLE 3
SUMMARY OF AMBIENT AIR QUALITY MONITORING RESULTS

Sr. No.	Location		PM ₁₀	PM _{2.5}	SO ₂	NO ₂	CO	Ozone	NH ₃
			µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	µg/m ³
1.	Project Site	Min	51.2	15.4	10.1	12.3	0.191	5.7	6.4
		Max	74.4	26.6	17.6	24.2	0.224	13.4	9.0
		Avg	65.5	22.2	14.5	20.4	0.210	10.5	7.7
		98 th	74.3	26.4	17.6	23.6	0.224	13.4	9.0
2.	Dhankuda	Min	47.8	15.9	5.1	10.2	0.215	5.8	5.4
		Max	71.4	23.8	12.4	18.0	0.325	10.0	8.0
		Avg	59.1	19.7	9.0	14.4	0.297	7.9	6.7
		98 th	69.7	23.2	12.2	17.9	0.322	10.0	8.0
3.	Garamsur	Min	53.3	17.8	6.6	12.6	0.289	6.4	6.0
		Max	71.9	23.6	20.3	28.1	0.385	17.4	11.0
		Avg	64.9	21.6	16.0	21.5	0.354	12.0	9.4
		98 th	71.3	23.6	20.0	26.7	0.385	17.1	11.0
4.	Sekapur	Min	51.1	17.0	9.6	16.0	0.201	6.5	7.0
		Max	73.5	24.5	14.9	21.5	0.238	10.4	9.3
		Avg	59.8	19.9	12.2	19.1	0.221	7.8	8.1
		98 th	72.9	24.3	14.9	21.4	0.237	9.8	9.2
5.	Ringnabodi	Min	52.9	17.6	8.2	12.5	0.122	7.2	6.6
		Max	69.1	23.0	16.0	19.5	0.239	13.1	9.1
		Avg	60.7	20.1	12.3	15.2	0.209	10.3	8.0
		98 th	68.6	23.0	15.8	19.4	0.238	13.0	9.1
6.	Bazargaon	Min	50.9	17.0	9.9	11.5	0.125	7.9	8.2



Sr. No.	Location		PM10	PM2.5	SO ₂	NO ₂	CO	Ozone	NH ₃
			µg/m ³	µg/m ³	µg/m ³	µg/m ³	mg/m ³	µg/m ³	µg/m ³
		Max	73.2	24.4	16.7	19.0	0.244	12.3	11.2
		Avg	61.3	20.3	13.4	15.1	0.146	10.1	9.4
		98 th	71.6	23.9	16.2	18.7	0.204	12.1	10.7
7.	Panjra	Min	50.1	17.1	8.1	9.3	0.101	6.6	7.8
		Max	75.1	25.0	16.0	16.0	0.136	12.1	10.7
		Avg	61.3	20.4	10.7	11.5	0.118	9.4	8.9
		98 th	75.0	25.0	15.7	15.4	0.135	11.8	10.4
8.	Mahsala	Min	54.9	18.3	7.5	15.1	0.111	5.2	6.2
		Max	72.3	24.1	15.2	22.2	0.171	9.3	8.8
		Avg	63.6	21.2	12.2	18.6	0.145	7.6	7.5
		98 th	72.2	24.1	15.2	21.6	0.167	9.3	8.8
CPCB Standards			100 (24hr)	60 (24hr)	80 (24hr)	80 (24hr)	2 (8hr)	100 (8hr)	400 (24hr)

TABLE 4
CONCENTRATION OF HEAVY METALS & VOCs IN AMBIENT AIR

Location	Pb (µg/m ³)	As (ng/m ³)	Ni (ng/m ³)	Benzene (µg/m ³)	BaP (ng/m ³)	Total VOCs (µg/m ³)
Project site	0.27	BDL	BDL	1.12	BDL	2.13
Dhankuda	0.19	BDL	BDL	BDL	BDL	BDL
Garamsur	0.16	BDL	BDL	0.52	BDL	0.93
Sekapur	0.17	BDL	BDL	BDL	BDL	BDL
Ringnabodi	0.16	BDL	BDL	BDL	BDL	BDL
Bazargaon	0.21	BDL	BDL	0.96	BDL	1.79
Panjra	0.21	BDL	BDL	BDL	BDL	BDL
Mhasala	0.16	BDL	BDL	BDL	BDL	BDL
Ambient Air Quality CPCB Standard	01 (24 hrs)	06 (Annual)	20 (Annual)	5 (Annual)	1 (Annual)	--

BDL: Below Detectable Limit

From the above results, it is observed that the ambient air quality at all the monitoring locations was within the permissible limits specified by CPCB.

3.2 NOISE ENVIRONMENT

Ambient noise level monitoring was carried out at the 08 locations; those were selected for ambient air quality monitoring. The monitoring results are summarized in **Table 5**.

TABLE 5
SUMMARY OF AMBIENT NOISE LEVEL MONITORING RESULTS

Monitoring Duration		17.12.2018-20.12.2018	December-2018	
Sr. No.	Location	Date of Sampling	Leq _{day}	Leq _{night}
1.	Project Site	17.12.2018	63.7	56.2
2.	Dhankuda	17.12.2018	52.9	41.6
3.	Garamsur	18.12.2018	48.3	37.1
4.	Sekapur	18.12.2018	53.9	42.7
5.	Ringnaboli	18.12.2018	47.3	38.1
6.	Bazargaon	19.12.2018	62.7	54.9
7.	Panjra	19.12.2018	48.3	38.2
8.	Mhasala	19.12.2018	51.7	42.8
Range				
CPCB Standards- dB(A)				
Commercial Area			65	55
Industrial Area			75	70
Residential Area			55	45
Silence Zone			50	40

Source: Field monitoring and analysis by Anacon Laboratories Pvt. Ltd., Nagpur



3.3 WATER ENVIRONMENT

3.3.1 Local Geology

The lithology in 10 km study area mainly consists of Deccan trap basalt & Sandstone of kamthi Formation (Equivalent of Lower Gondwanas). The study area around the project site does not have major faults or shear zone.

3.3.2 Local Hydrogeology and Aquifer Systems

In the area, ground water occurs under semi confined to un-confined condition in weathered portion of rocks and semi-confined to un-confined conditions in fractures and jointed part of rocks i.e. basalt at depths.

The shallow aquifers of the study area occur within an average depth of 5-15m.

Pre-monsoon water level in the study area ranges from 10 to 12 mbgl whereas Post-monsoon water level ranges from 3 to 7 mbgl.

3.3.3 Geomorphology

The study area mostly shows pediment zone. A pediment zone is a relatively gently sloping surface of bedrock that occurs at the base of a mountain or as a plain having no associated mountain. The angle of a pediment's slope is generally from 0.5° to 7°.

3.3.4 Surface and Ground Water Quality

14 water samples were collected from various sampling locations, eight (8) from each groundwater and six (6) surface water sources.

Surface water quality

The analysis results indicate that the pH ranged between 7.32-7.87. The TDS was observed to be 325 - 694 mg/l which is within the permissible limit of 2000 mg/l. The total hardness recorded was in the range of 165.62 – 384.06 mg/l as CaCO₃ which is also within the permissible limit of 600 mg/l. The levels of chloride and sulphate were found to be in the range of 13.69 – 42.85 mg/l and 9.31 – 38.18 mg/l respectively.

Dissolved oxygen (DO) refers to the amount of oxygen (O₂) dissolved in water. The reported value of range of 5.1 – 6.2 mg/l.

Groundwater quality

Location wise Water Quality Assessment

Sr. No.	Locations	WQI	Quality	Remark
1	Project Site	59.09	Good	Water quality assessed based upon above physico-chemical parameters and all samples are physico-chemically good.
2	Dhankuda	68.05	Good	
3	Garamsur	60.60	Good	
4	Sekapur	54.65	Good	
5	Ringnabodi	60.04	Good	
6	Panjra	59.75	Good	
7	Bazargaon	61.21	Good	
8	Salai	57.42	Good	

Remarks

Coliform group of organisms are indicators of faecal contamination in water. Bacteriologically, all surface water samples were contaminated and water treatment followed by chlorination or disinfection treatment is needed before use for domestic purpose whereas groundwater samples were not bacteriologically contaminated and suitable for domestic use



3.4 LAND ENVIRONMENT

3.4.1 The land-use & land cover map of the 10 km radial study area from the periphery of project site has been prepared using Resource SAT-2 (IRS-P6), sensor- LISS-4 having 5.6 m spatial resolution and date of pass 29th April 2018 satellite image with reference to Google Earth data and the IRS-P5- Cartosat-I data having 2.5 m spatial resolution and date of pass Jan 2016. In order to strengthen the baseline information on existing land use pattern, the following data covering approx. the proposed project site as well as the 10 km radius from the periphery of the project site i.e. 21°09'31.63" N - 21°35'02.22" N latitude and 78°38'30.09" E - 78°50'07.11" E longitude and elevation 410-470 meter are used.

**TABLE 6
LU/LC AND ITS COVERAGE WITHIN 10 KM RADIUS**

Sl. No.	Level-I	Level-II	Area Sq. Km	Percentage
1	Built-up land	Settlement	58.87	18.75
		Industrial Settlement	22.1	7.04
		Road Infrastructure	7.63	2.43
		Railway	1.53	0.49
		Brick Kline	1.87	0.60
2	Barren Land	Barren Land	0.98	0.31
3	Agricultural Land	Agriculture land	180.71	57.55
5	Scrubs/Wastelands	Open Scrub	29.21	9.30
6	Water bodies	River	4.92	1.57
		Water bodies	2.31	0.74
		Drainage	1.98	0.63
7	others	Mining/Stone Quarry	1.89	0.60
	Total		314	100

3.4.2 Soil Characteristics

Eight soil samples were collected from different locations of the study area. The monitoring was carried out once in the study period during winter season 2018 and analyzed for significant parameters. The results indicated the following:

Soil characteristics in the study area

The bulk density of the soil in the study area ranged between 1.42 – 1.64 g/cc which indicates favourable physical condition for plant growth. The water holding capacity is between 18.0 - 35.05 %. Infiltration rate, in the soil is in the range of 17.21 – 27.23 mm/hr. The pH of the soil in the study area is found to be range of 6.74 – 8.91 in reaction. Electrical conductivity is in the range of 30.4 – 70.3 μ S/cm. The calcium and magnesium whose concentration levels ranged from 334.06 – 533.12 mg/Kg and 40.11 – 320.12 mg/Kg respectively. Chloride is in the range of 192.8 – 320.17 mg/Kg. Organic matter and nitrogen were found in the range of 0.7 – 1.18 % and 102.2 – 160.2 kg/ha.

The overall fertile status is moderate, low productivity & moderate absorptivity

3.5 BIOLOGICAL ENVIRONMENT

The baseline study for existing ecological environment was carried out during 22nd to 24th November 2018. Total study area spread over 10 km radius from the center point which are classify into Core zone and Buffer Zone. Core Zone defined as existing plant premises i.e. 46.04 Ha of plant premises, Buffer Zone considered as rest of 10 km radial distance from the periphery of the project site. Biological study conducted in various villages within the study area viz. project site, Garamsur, Dhankuda, Dhaga, Bazargaon, Ganeshpur, Maragsur, Wasbodi, Chikhli along with various Reserve



Forest especially Kondhali RF, Dhaga Forest and other protected forests which falls within 10 km study area.

Floral Biodiversity of the Study Area

- a. **Trees:** Total 68 species were found in the study area
- b. **Shrubs (small trees):** Total 29 species were enumerated from the study area.
- c. **Herbs:** In the study area 21 species were observed.
- d. **Bamboo & Grasses:** 13 species were enlisted from the study area
- e. **Climbers and Twiners:** Total 13 species of climbers/ twiners were recorded in the study area.
- f. **Epiphyte & Parasite :** Each 1 species enlisted in the area

Fauna in the study area

The 10 km radius study area was found to be a home to several species of mammals, reptiles, Aves and other lower invertebrates. As described earlier, the part of study area is covered with forest. Big wild animals like Wild boar, Sabhar, Nilgai, Barking deer, spotted deer as well as small sized fauna like Jackal, Monkey, etc. were found in the connected Reserve Forest area within study area.

Birds were observed throughout the study area mostly near the forest area and water bodies namely Bazargaon Village Lake. Reptiles and amphibians were also observed in the study area. Fresh water fishes were also reported in Bazargaon lake and Jam and Bor River in the study area. The details of Fauna observed/reported provided in **Annexure VIII C**.

3.6 SOCIO-ECONOMIC ENVIRONMENT

Socioeconomic survey was carried out to know the infrastructural activities amenities available within 10 km radius from Project Site. The information regarding facilities available and the opinion of the people was sought by floating questionnaires and interaction with the people. This is done for observing the impact due to the project wrt social aspects so that proper actions / measures could be taken up for the benefit of the people (economically and wrt quality of life) and the project.

The proposed project expansion will generate additional employment. Preference will be given to qualified locals during employment as per policy. Additional capital investments will contribute to State/National level exchequer. Thus the project would be beneficial for the society at large and the additional revenue generated will help enrich regional growth/State and vital FOREX will be value addition.

4.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

4.1 IMPACTS DURING OPERATION PHASE

4.1.1 Land Environment

There may be some pollution, which may affect the soil adjacent to the plant area, if proper care is not taken. The anticipated pollution to soil environment due to plant activities is as follows:

- Changes in soil texture due to settling of air borne dust or due to wash off solid particulates by surface or groundwater. This will lead to change in porosity, permeability and other such physical characteristics of soil of the area.
- Changes in soil chemistry due to addition of foreign materials from polluted air and water due to plant activities in the area.

Proper mitigative measures like use of efficient pollution control systems, proper stack height and use of top soil in plantation results in no significant impact on soil of the project site. There will be no impact on soil of the study area located beyond the working area of the project.



4.1.2 Air Environment

- **Details of air dispersion model**

Assessment of air pollution was carried out for stack attached to boiler, D.G. sets etc. The ISCST-3 (Industrial Source Complex – short term-3) from Lakes Environment is an hour-by-hour steady state Gaussian Plume Model. This model is widely recognized as predictive tool in impact assessment for air environment. The ISCST-3 model was applied with the consideration of elevated + flat terrain, gradual plume rise and buoyancy induced dispersion options in the present study.

- **Stack details**

The stack details viz, height, diameter, temperature, velocity, volumetric flow and emission rates are presented in **Table 4.1**. Total 5 stacks were considered which is attached to the respective equipment through which the emissions are likely come out.

- **Resultant Concentrations**

The maximum incremental ground level concentrations (GLCs) for particulate matter, SO₂ and NO₂ due to existing and proposed expansion developmental activities were carried out. The predicted 24 hourly maximum concentrations for existing facilities (Boiler-1 TPH and DG sets 200 KVA, 500KVA) for particulate matter, SO₂ and NO₂ are found to be 1.35µg/m³, 0.034µg/m³ and 8.5µg/m³ respectively. For proposed scenario (Boiler-3 TPH and DG set 500KVA) for particulate matter, SO₂ and NO₂ are found to be 1.7 µg/m³, 0.95µg/m³, 5.6µg/m³ respectively. The after expansion scenario concentration levels (Boiler-3 TPH+1TPH and DG sets 200 KVA, 2x500KVA) of particulate matter, SO₂ and NO₂ are observed 3.2µg/m³, 1.0 µg/m³, 14.5 µg/m³ respectively. The short term modeling results are presented in **Table 4.2**. The isopleths of particulate matter, SO₂ and NO₂ representing the GLCs for existing, proposed and existing + proposed scenario are shown in **Figures 4.2 to 4.10** respectively.

The resultant concentration levels (Ambient + proposed incremental) revealed that the concentration levels for particulate matter, SO₂ and NO₂ likely to be encountered in the operation of the project are respectively occurring at a distance of about 1.4 km each in the SW and WSW directions with a concentration levels (resultant) of 77.6 µg/m³, 21.3 µg/m³ and 42.6 µg/m³ respectively and details are given in **Table 4.3**, which is well within the NAAQS levels prescribed by CPCB. Hence it is inferred that considering cumulative concentration levels, the pollution load exerted due to proposed project will be insignificant.

- **Impact Study Due to Proposed Traffic Density**

The existing road is capable of absorbing this additional truck movement. The total raw material required for proposed new products is estimated to be 75850 Tons/Annum max and the traffic density will be ~12 trips max per day. Hence, the increase in traffic load will be very less. So there will be insignificant effect on the nearby surrounding. The receptor villages are far away from project site so there will not be any adverse impact due to vehicular traffic.

- **Vehicular Emission**

The national highway (NH-6) is passing from the 10 km radius of the project location and it is shown in **Figure 4.5**. Heavy traffic was observed on the national highway. It was observed that nearly 925 vehicles were plying on NH-6.

- **Impact Due to Odour**

To avoid air pollution due to odour following mitigation measures will be adopted:



- Existing green belt is covering 51% of the total project area, around the plant boundary as dust preventive barrier.
- **Odour Control System:** All operations are carried out in closed system, and solvents will be connected to scrubber to avoid every possibility of odour escaping into atmosphere.

4.1.3 Noise Environment

Predictions have been made taking into account even DG set in operation and thus reflecting the worst case scenario. The maximum predicted noise level within the plant boundary (0.1 km radius) is 51.0-61.0 dB (A) respectively day and night time. Noise level at a distance of 0.5 km radius of the plant is predicted to be less than 50 dB (A) which is well within the standards.

➤ Impacts on Community

Day and night sound pressure levels are often used to describe the community exposure which includes 10 dB (A) night time penalties. The nearest human settlement Dhankura is 800 m away from project site and predicted noise level at this village is 51.7 dB(A) and 44.8 dB(A) at day night respectively.

4.1.4 Water Environment

Source of Water Supply and Requirement

The daily water requirement for the existing Explosive Industrial Unit is 16.5 KLD. KEL obtained NOC from CGWA for 16.5 KLD for ground water extraction. Water is being sourced from two existing bore-well within plant area. The proposed expansion is requires about 63.5 KLD of water.

Wastewater Generation

Total treated wastewater via ETP 23 KLD will be recycled in the process whereas treated sewage 10 KLD will be used for development of green belt.

Zero liquid discharge (ZLD) will be complied.

4.1.5 Biological Environment

No forest land involved in the project activities. The proposed expansion activities will be carried out within the existing plant premises. There are no endangered flora and fauna species in the region except common peafowl (*Pavo cristatus*) which is schedule I species as per WPA 1972 whereas least concern species as per IUCN. The anticipated impacts during the operation phase to adjacent Kondali reserve forest will be compensated by existing fencing, existing green belt 51% (58 acres) and additional greenbelt planned within 14% (15.9 acres) of total area. This thick blanket of green belt will be helpful to minimize the impacts on surrounding environment. Vehicular movement during night will be restricted to avoid adverse consequence to birds and wide animals in the region. The project activities are restricted to the factory site except the transportation of raw material and products. There is no discharge of solid or liquid wastes to the environment. The plantation will comprise of fruiting trees, soil improving and air pollution abatement trees. No eco sensitive receivers or rare / endangered species of fauna were observed in the study area. Thus, the impacts on flora and fauna will be insignificant.

Greenbelt within plant premises

Total area of 113.72 Acres out of which 1.3 Acres are identified for the proposed project. The plantation and green belt covered land is 58 acres, which is 51% of total project area of 113.72 acres.



At present green belt is developed around the factory site with suitable plant species. At present green belt is developed around the factory site with suitable plant species. Presently 18007 nos. of trees grown in existing plant premises. Details of greenbelt development are present in **Chapter 10**.

4.1.6 Socio-Economic Environment

The project indicates rapid economic growth and development moreover help in improving amenities including road, supply of water or electricity, medical care, street lighting, drainage, sewerage and such other convenience. This helps to improve human development index.

M/s Keltech Energies Ltd. to undertake social welfare programs for the betterment of the Quality of Life of villages around in collaboration with the local bodies.

Thus the proposed project expansion will achieve three objectives – job creations for locals, achievement of the longer-term capital investments. Additional revenue generated will add to regional growth. Hence the project is beneficial for Region as well as State and Nation at large.

The overall impact of all the three objectives will help in enhancing / upliftment of Social Status of the state as well as the local area.

5.0 ANALYSIS OF ALTERNATIVES (SITE AND TECHNOLOGY)

5.1 Study of Analysis of Alternatives Related to Site

M/s. KEL proposed expansion project area is located within the existing plant at Village Garamsur, Post Dudhala, Survey No. 146,147,148/1, 149/1, 149/2, 151/1, 151/2, 152/2/2, 153, 154/1, 154/2, 155, 156/ 157, 158/1, 164, 165, 158/2, Tehsil - Katol, District- Nagpur-441103, Maharashtra.

The land area is available with KEL for manufacturing mining explosives and accessories. Hence site is already selected by project proponent and no alternative site is required. KEL has adequate land area for proposed expansion and hence expansion is proposed within existing land area. No additional land is required.

Since the existing land area is adequate and proposed expansion is confined within existing land the question other site alternatives does of site.

More over for explosive manufacturing string out compliances from dept. of Explosive factory Inspector and other regulatory bodies are already obtained for the existing site KEL have not considered others alternatives site.

The land is acquired within existing and therefore no change in land use pattern is envisaged.

5.2 Analysis of Alternatives Related to Technology

The products manufacturing is based on the need of the products and market availability. The raw materials will be transported through the existing network. The technologies for the establishment of the manufacturing activities will be in placed as per know-how.

The management has decided to adopt the best operating practices to suit world class requirements. As the products are going to be exported, external audits to fulfill QA/QC requirements. The products will be manufactured based on green chemistry concept so that there is minimum emissions and minimum wastewater generation during manufacturing process.

Hence best technological environment friendly approach is selected.

6.0 ENVIRONMENTAL MONITORING PROGRAMME

The environmental monitoring program is presented in **Table 6.1**. The equipment, laboratory setup and budget required to carry out the environmental monitoring is given in **Table 7**.



The project will be based on state of the art technology which will help in reducing the pollution from the plant. The project is also equipped with pollution monitoring systems to help the plant operators. These measures will help in minimizing the adverse impact on the environment during the operational phase.

6.1 Budget for Implementation of Environmental Monitoring Plan

An effective Environmental Monitoring Plan is proposed during the construction and operational phases of the project to conserve the environment at site. The capital expenditure will be incurred for implementing the Environmental Monitoring Plan.

TABLE 7

BUDGETARY PROVISIONS FOR ENVIRONMENTAL MONITORING PROGRAMME (Rs. in lakhs)

Sr. No.	Environmental Component	Capital Cost	Recurring Cost
1	Air Environment including Multi-cyclone dust collector for boilers	7	1.0
2	Noise Environment	-	0.5
3	Water Environment (water & wastewater)	3	1.0
4	Land Environment (Soil monitoring / reclamation)	-	0.5
5	EC compliance and due diligence ETP/WTP	-	1.0
Total =		10	4

7.0 ADDITIONAL STUDIES

7.1 RISK ASSESSMENT AND DISASTER MANAGEMENT PLAN

Risk Analysis

Accidental risk involves the occurrence or potential occurrence of some accident consisting of an event or sequence of events resulting into fire, explosion or toxic hazards to human health and environment risk assessment (RA) provides a numerical measure of the risk that a particular facility poses to the public. It begins with the identification of probable potential hazardous events at an industry and categorization as per the predetermined criteria. The consequences of major credible events are calculated for different combinations of weather conditions to simulate worst possible scenario. These consequence predictions are combined to provide numerical measures of the risk for the entire facility.

Hazard Identification

- Identification of hazards is an important step in risk assessment as it leads to the generation of accidental scenarios. The merits of including the hazard for further investigation are subsequently determined by its significance, normally using a cut-off or threshold quantity.

7.2 REHABILITATION & RESETTLEMENT ACTION PLAN

There are also no oustees or project affected persons or home oustees, thus R & R plan is not required for this project.

7.3 SOCIAL IMPACT ASSESSMENT

The project proponent will provide welfare activities, recreational facilities in the surrounding villages once the plant commences production. The management will conduct regular health checkups in the surrounding villages. There will be enhancement of educational standards of people in the study area. There will be positive and beneficial impacts by way of economic improvements, transportation, aesthetic environment and business generation. There will be an overall upliftment of socio-economic status of people in the area.



7.4 BIODIVERSITY CONSERVATION

Peacock or Indian peafowl reported within the study area falls under the schedule-I category. The rest of the fauna reported from the study area, falls under either in schedule-II, Schedule-III or Schedule-IV of the Wild Life Protection Act 1972 and as amended. The conservation plan is prepared for *Pavo cristatus* (Peacock).

7.5 PUBLIC CONSULTATION

After the completion the public consultation process, the issues raised by the public, their compliances and commitments made by the Project Proponent during the public hearing will be incorporated in the final EIA/EMP report and the final EIA/EMP report will be submitted for environmental clearance of the proposed expansion of the project.

8.0 PROJECT BENEFITS

The proposed manufacturing unit has made improvement in infrastructure as well as overall socio-economic development in the area. The people residing in the nearby areas are being benefited directly and indirectly as well. The project is providing benefits for the locals during operational phase of the activity.

Advantage In-Terms of Explosive Manufacturing

Explosive manufacturing is prime concern for rapidly developing countries like India, In India lot of infrastructure development work and mining related actives are growing at a faster rate. To support these activities explosives are required.

The products that will be manufactured by M/s. KEL will have a high market potential. Due to increasing demand, the plant has own economic importance.

Export potential- The Company has exported goods worth Rs.1394.96 lakhs (C & F) during the last financial year for explosive/perlite division.

Manufacture of explosives, cryogenic insulation, perlite filter aid, horticulture products as well as perlite products for the construction, refractory & foundry Industries.

There is a strong demand of the proposed products in the domestic market from various mining activity. International demand for the products is also large as the numbers of international manufacturers of the proposed products are also limited. The sale of explosives in international markets will be subject to approvals from the Government of India.

This will help to increase the economy of the region, state and thereby the country itself. There are other intangible benefits apart from the tangible benefits which will help to improve the economic status of the state and the country.

The proposed project expansion will generate additional employment. Preference will be given to qualified locals during employment as per policy. Additional capital investments will contribute to State/National level exchequer. Thus the project would be beneficial for the society at large and the additional revenue generated will help enrich regional growth/State and vital FOREX will be value addition.

Thus the proposed project expansion will achieve three objectives – job creations for locals, achievement of the longer-term capital investments. Additional revenue generated will add to regional growth. Hence the project is beneficial for Region as well as State and Nation at large.

The overall impact of all the three objectives will help in enhancing / upliftment of Social Status of the state as well as the local area.



Other tangible benefits

Existing explosives manufacturing unit going for addition of new products and supplying to mining explosives organizations (GOI). These products plays vital role for national safety & security.

9.0 ENVIRONMENTAL COST BENEFIT ANALYSIS

M/s KEL has proposed expansion of existing and addition of new explosive products, company has further approached to DIPP, Govt. of India for enhancement of capacity of PETN, Lead Azaid, Lead Styphnate and MMAN respectively.

All the basic requirements for the production are in placed including infrastructure availability. The increase in production of chemicals will be available to the user. It will definitely boost the economic growth of the country; develop region and quality of life of the people in a sustainable manner without creating any significant.

9.1 ENVIRONMENTAL VALUE ENHANCEMENT (BIODIVERSITY, CROP PRODUCTIVITY, ECO-TOURISM)

The project site is for proposed expansion well connected to railways, roadways and airways. The proposed expansion project falls within existing project. Therefore, it will not involve loss of vegetation and biodiversity. The vegetation is similar in the whole area with no sensitive ecosystem or rare and endangered flora or fauna, hence no environmental loss will be there in terms of net productive value.

The total project cost is estimated to be **Rs. 63.17 Crores** and expenditure on implementation of the Environmental Management Plan (EMP) is presented in **Chapter 10** of this report. Besides tangible benefits, the project has got number of intangible benefits like minimum emission of the generated gases, no adverse impact on environment as far as air, noise and water environmental components are concerned. Individual industry will take care of environmental management.

10.0 ENVIRONMENTAL MANAGEMENT PLAN

The main objectives in formulating this environmental management plan are:

- To limit / reduce the degree, extent, magnitude or duration of adverse impacts.
- To treat all the pollutants i.e. liquid effluent, air emissions and hazardous waste with adoption of adequate and efficient technology.
- To comply with all the norms and standards stipulated by Maharashtra Pollution Control Board / Central Pollution Control Board.
- To reduce any risk hazards and design the disaster management plan.

Continuous development and search for innovative technologies for a cleaner and better environment

11.0 SUMMARY AND CONCLUSIONS

Considering the silent features of the project as described in EIA report. Summary of the project in terms of environmental, technical aspects and economic feasibility the details are as under ;

All activities are confined to private industrial land and minimum possible emission is allowed to enter in to the environment due to proposed expansion project. Thus environment will not be adversely affected in any way.

- The wastewater generated will be treated and recycled/reused in the process. Zero discharge condition is followed by plant.
- Wastewater is treated in full-fledged effluent treatment plant. The treated wastewater will be reused in the process.
- For disposal of domestic waste water KEL has installed septic tank followed by soak pit. Outlet of soak pit is used for gardening and irrigation within plant premises. After proposed expansion the



entire domestic waste water will be collected at one point and sewage treatment plant is proposed with constructed wet land technology of factory premises.

- The development of green belt and plantation will help to attenuate the noise levels and restrict air pollution and will increase the aesthetics.
- The product waste generated is recycled, reused. Additional solid waste will be incinerated within plant and ash will be sent to TSDF.
- Overall socio economic benefits of the region is going to enrich.
- Apart from this, the environmental management plan delineated may help to reduce pollution by implementation.
- The enterprise social commitment policy (formerly CSR) will work further to bring out the development of the surrounding villages and thus area and quality of life of people will be improved.
- The cost of environmental control and monitoring measures are computed and provision for capital & recurring is made by the management.
- M/s. KEL is presently employing 164 people and proposed expansion additional 90 direct manpower will be employed. Total after expansion manpower requirement will be 254. In addition to above direct employment of 90 employees after expansion, the indirect employment of around 200 persons with enhanced transport activities, canteen, security, maintenance, increased local vendors etc. Hence the proposed expansion involves additional 90 employees and 200 indirect employment potential.
- Employees, company and region will be directly / indirectly benefitted.
- The project would be beneficial for the society at large and the additional revenue generated will help enrich regional growth/State and vital FOREX will be value addition.
- Additional revenue generated will add to regional growth. Hence the project is beneficial for Region as well as State and Nation at large

Concluding Remarks:

Thus it can be concluded on a positive note that after the implementation of the mitigation measures, Environmental Management and Monitoring Plans as enumerated above, the normal operation of **M/s KEL** will have no significant impact on environment after expansion and the project will be benefitted to local people to some extent with an economic growth in state/ country level.

12.0 DISCLOSURE OF CONSULTANTS

The Environmental studies for proposed expansion project of M/s KEL are carried out by M/s Anacon Laboratories Pvt. Ltd., Nagpur (M/s ALPL). Anacon established in 1993 as an analytical testing laboratory and now a leading Environmental Consultancy firm backed by testing lab for environment and food in Central India region. M/s ALPL is a group of experienced former Scientists from the Government Institutions and excellent young scientist of brilliant career with subject expertise. It is recognized by Ministry of Environment & Forests, New Delhi for carrying out environmental Studies & accredited by Quality Council of India (QCI) for conducting Environmental studies as per QCI-NABET RA – 132nd AC Meeting, dtd. May 30th, 2017 as Cat A consultant for 5 (f) & 6 (b) sectors.