EXECUTIVE SUMMARY

Introduction

Prasol Chemicals Limited has proposed expansion of existing synthetic organic manufacturing facility located at survey nos. 8, 13, 15, 16, 25 & 75 on Takai Adoshi Road, at Village Honad in Khalapur Tehsil of Maharashtra. The expansion is based on backward integration to produce raw materials like Acetone, Phenol, Mesityl Oxide, ZDDP & Hydrogenated compounds to company's product portfolio.

Project Description

The project is about expansion of existing manufacturing facility of Prasol Chemicals Ltd. Existing products and their quantities are listed in **Table 1** below where as list of products proposed under expansion are listed in **Table 2**.

Table 1: Existing Products and Capacities

Sr. No.	Product	Quantity (MT/A) *
1	Di-Acetone Alcohol	9000
2	Nonyl Phenol	720
	By-Product	
	Di-Nonyl Phenol	36
3	Phosphorous Pentasulphide	6000
4	Phosphoric Acid- Food grade	600
5	Phosphorous Pentoxide	624
6	Dil. Phosphorous Acid	6
7	Isophorone	3600
Total		20586

(*) Maximum production quantities as per M.P.C.B. Consent to Operate No. O/PAMS/E/EIC NO.RD-2170-11/CC 226 dated 30th December 2011 and valid up to 30 July 2014.

Table 2: List of Products Proposed for Expansion

S. No.	Product	Quantity (MT/A)
1.	Phenol	20000
2.	Acetone	12000
	By-products	
	Alpha Methyl Styrene	1500
	Acetophenone	800
3.	Zinc Di-organo Dithiophosphate	1500

4.	Mesityl Oxide	750
5.	Hydrogenated Compounds	1800
Total		38350

Justification of Proposed Expansion

In the existing plant, the company's major raw material is Acetone. India is a net importer of Acetone, hence the backward integration to produce acetone will help the company to face the vagaries of imports and transportation of hazardous raw materials will be avoided. India is net importer of Phenol, Mesityl Oxide & Hydrogenated compounds. The proposed facility will help in reducing the import of Phenol, Acetone, Mesityl Oxide and Hydrogenated Compounds and will also bring in foreign exchange. ZDDP has variable demand in India. Hence, this product will be imported and exported based upon the requirements and market conditions. Apart from benefits mentioned above, the capacity expansion will create new employment opportunities of direct and indirect nature.

ToR Approved by MOEF

As per provision in EIA notification 2006, the ToR for the project was presented to MOEF in its 2nd meeting held on 29-31th October, 2012 and same was approved. Copy of approved ToR along is attached as **Annexure – 1**. Compliance to various TOR items as per the MOEF TOR is enclosed in EIA (Refer Chapter 1, Table 1.2).

Manufacturing Process Characteristics of Proposed Products

Manufacturing of Acetone & Phenol from Cumene

Manufacturing of Phenol and Acetone is two stages Cumene Peroxidation Process. First stage is oxidation of Cumene to Cumene Hydro Peroxide (CHP) followed by acid catalyzed decomposition (cleavage) of CHP to Phenol, Acetone.

There will not be any solid waste generation from the process. [By-products will be generated in the form of Alpha Methyl Styrene (1500 MT/A) and Acetophenone (800 MT/A)]. Hazardous waste (HW) will be generated in the form of Tar (1500 MT/A). HW will be sold to authorized parties by MPCB or shall be sent to TSDF Taloja. Small VOC emissions in form of vapors may occur through process vent which will be condensed and recycled back to process. Effluent will be generated from oxidation section and distillation section (Acetone fractionation) process.

Manufacturing of Zinc Di-organo Dithiophosphate (ZDDP)

The first step includes the synthesis of Oxo-Alcohols and Phosphorus Pentasulphide to form

a dialkyl, dithiophosphate acid. The second step involves the neutralisation of the acid with zinc oxide giving water as by-product. After the above reaction is complete, the product mass is steam distilled to remove the water.

No solid waste will be generated. The Hydrogen Sulfide (H_2S) gas generated during reaction will be passed through overhead condenser and then routed through Primary and Secondary Caustic Scrubbers to form 32% Sodium Hydrogen Sulfide. The traces of H_2S coming out of Secondary Scrubber will be burnt in the Emergency Flare system. The carryover of Alcohol from Reactor will be condensed in Overhead Condenser and returned back to the Reactor. The end point of the reaction is determined by analyzing the Acid Value of the Reactor content. Hazardous waste generated will be 38 MT/A which will be sent to TSDF Taloja for disposal. No water is required as part of production process. No effluent generating in this process.

Manufacturing of Mesityl Oxide

Mesityl Oxide is manufactured by the dehydration of Acetone in presence of an acid catalyst followed by distillation to obtain the pure product. The pure MO is then stored in a product tank or packed as per requirements. The process includes two step reactions.

There will not be any air pollution generation, solid waste generation and hazardous waste generation from this process.

Manufacturing of Hydrogenated Compounds

Hydrogenation plant will be set up for manufacturing set of products alternatively, based on the demand and raw material availability. Hexylene Glycol, Tri-Methyl Cyclohexanol, Tri-Methyl Cyclohexanone, MIBK/MIBC and Isobutyl Carbinol etc. are proposed hydrogenated products.

There will not be any air pollution generation, solid waste generation and hazardous waste generation from this process.

Study of Environment

Considering the local and regional setting of the area surrounding the plant facility, surrounding area of 10 km of the plant site is considered as study area for setting up environmental baseline to study/ predict the impacts in surroundings due to the proposed expansion in existing premises, as per MoEF guidelines. Environmental data monitoring was done during winter of 2012 for meteorology, air quality, water quality, noise levels and soil characteristics, by setting up four monitoring stations. Further, existing ecological and

socioeconomic features were also studied.

Land Environment

Chemical plant site is located in Honad industrial zone near village Honad. The site falls between $18^0$46'18" (N) to $18^0$46'37" (N) and $73^0$18'05" (E) to $73^0$18'15" (E). The area comes in Taluka Khalapur of Raigad district in Konkan, near west coast of Maharashtra; India. Total plot area of plant is 64773 sq. m. and the site is well connected by road. Mumbai – Pune highway (NH – 4) is at 3 km (North East) from site. The area does not fall in seismically active or land slide prone zone.

Air Environment

The baseline air quality was established by monitoring major air pollutants PM_{10}, SO_2, NO_X, Co, NH_3 and nMHC at seven locations in study area for 24 hours during of winter 2012. The air quality was observed to be within the NAAAQS norms for residential and rural area. Summarized results of air monitoring are given below.

Table 3: Summarized results of air monitoring

Location		PM_{10} (µg/m³)	SO_2 (µg/m³)	NO_x (µg/m³)	CO (mg/M³)	NH_3 (mg/m³)	Non-Methane Hydrocarbon (ppm)
Honad	Maximum	80.63	16.98	19.55	BDL	56	0.18
	Minimum	38.71	4.98	5.03	-	BDL	BDL
	Percentile (98%)	78.49	16.62	19.09	-	-	-
Thanehave	Maximum	71.79	18.96	20.12	BDL	28	BDL
	Minimum	39.54	5.18	6.12	-	BDL	-
	Percentile (98%)	71.59	18.23	19.75	-	-	-
Sajgaon	Maximum	86.92	26.07	21.73	BDL	BDL	0.12
	Minimum	35.85	4.57	4.51	-	-	BDL
	Percentile (98%)	84.49	24.47	19.70	-	-	-
Onsite	Maximum	89.9	27.6	17.49	BDL	BDL	0.12
	Minimum	66.72	4.06	4.88	-	-	BDL
	Percentile (98%)	89.44	24.20	16.89	-	-	-
Mahad	Maximum	82.4	12.7	26.8	2	62	0.12
	Minimum	34.6	BDL	10.4	BDL	BDL	BDL
	Percentile (98%)	80.7	11.8	25.4	-	-	-
Adoshi	Maximum	58.3	8.9	15.3	-	-	-

	Minimum	18.2	BDL	BDL	BDL	BDL	BDL
	Percentile (98%)	57.1	8.1	15.0	-	-	-
Devnave	Maximum	64.9	8.7	17.1	BDL	-	-
	Minimum	17.2	BDL	BDL	-	BDL	BDL
	Percentile (98%)	62.1	8.4	16.8	-	-	-
NAAQS Standards		100 ($\mu g/m^3$)	80 ($\mu g/m^3$)	80 ($\mu g/m^3$)	02 (mg/m^3)	400 ($\mu g/m^3$)	-

Two new stacks are proposed, which are going to be attached to boiler and thermic fluid heater in utility section. Fuel used for boiler and thermic fluid heater will be coal will be additional. Hence, air modeling studies for both proposed stacks was carried out. PM_{10}, SO_2, and NO_X parameters were studied and impacts were analyzed. Detailed studies are presented in chapter 5 of EIA report but as per modeling studies the maximum incremental increase in concentrations is 3.67µg/m^3 for SO_2, 1.32µg/m^3 for NO_X and 2.09µg/m^3 for PM_{10}. The incremental increase will have negligible impact on the air environment.

Water Environment

Three ground water samples were collected from locations Thanenhave, Honad, Sajgaon. Quality of ground water on analysis was observed to be well within norms and it meets Physico – chemical criteria. Ground water are Honad and Sajgaon meet microbiological criteria but ground water sample at Thanehave has slight microbial contamination (Coliforms = 80 org/100ml, norm= 10 org/100 ml).

Two surface water samples were collected at Sajgaon and Honad. Water sample from dam at Thanenhave was collected as that water is supplied to nearby villages for drinking and domestic purposes. Surface water quality as Sajgaon was observed to be good but nalla water at Honad (upstream of Prasol plant) is stagnant with high organics and needs treatment before use. Quality of dam water sample was observed good and free from microbial contamination.

Total fresh water requirement after proposed expansion will be 480 cmd. Source of water will be ground water and tankers. Plant facility will be maintained as zero discharge as follows:

1. Low Organic Effluent from Cooling/ DM Plant/ Boiler break down will be collected, neutralized and settled. Settled effluent will be sent for gardening or PRIA CETP for treatment. This shall be upgraded to meet requirement.

2. High Organic Effluent from Process and Equipment/ Floor wash generated will be treated in Effluent Management System comprising Decantation (hereby hydrocarbon rich stream is reused in process); Aq. Stream is then treated in Triple Effect Evaporator (TEE) and recovered water will be used for Cooling purposes.

Prasol has CETP membership and certificate is enclosed herewith as **Annexure – 8.** Sewage generated from tank is collected in septic tank/ soak pit. Overflow of septic tank/ soak pit is used for green belt and gardening.

Soil Environment

The soil in the study area of plant site is either black soil or red soil (rich in iron). Quality of soil in study area is good and suitable for tree plantations and green belt development. Only deficiency of available nitrogen which can be taken care and accordingly fertilizers shall be required at time of green belt development and tree plantations.

Noise Environment

Noise monitoring was done at 4 locations same as AAQ monitoring in winter of 2012. Noise levels observed in this region are within the CPCB standards. The reason being population density is relatively low. Summarized below in tabulated format.

Table 4: Summarized noise monitoring results [Leq. (dB-A)]

Sr. No.	Locations	Day	Norms	Night	Norms
1	On-Site	60.8	75	54.3	70
2	Honad	48.7	55	42.3	45
3	Sajgaon	48.2	55	41.2	45
4	Thanenhave	48.5	55	40.8	45

Solid & Hazardous Waste Management

Coal is used as fuel in boilers and thermic fluid heater which will be continued even after expansion. Presently ash production is 1.2 – 1.3 MT/day which will rise to 2.0 – 2.2 MT/day after expansion. Ash will be sold to local brick makers or will be used for landfills. Other source of solid waste generation from the plant will be in the form of domestic waste. The solid waste generated will be disposed off in environmentally sound manner.

Sources of hazardous waste generation and their quantities from the manufacturing plant after expansion will be as shown in table below;

Table 5: Hazardous Waste Generation Details

Category	Description	Quantity TPA	Disposal
20.3	Tar from Phenol/ acetone manufacture	1500	MPCB Authorized Parties / Cement mfrs/ Disposal to MWML
20.3	Residue from ZDDP mfr	38	Disposal to MWML / Cement mfr/ MPCB Authorized Parties.
34.3	ETP sludge	80	MWML, Taloja
5.1	Used Oil	6	Recycler

HWs will be sent to hazardous waste disposal facility at Taloja through trucks owned by MPCB authorized contractors. CHWTSDF Taloja certificate attached herewith as **Annexure – 5**.

Biological Environment

The plant facility is located at a distance of 2 km from village Honad. Core zone is majorly occupied by industries in Honad industrial zone. On the East of the plant facility at a distance of around 60 m there is a hillock covered with trees and shrubs. Buffer zone also comprises of small and medium size hills having presence of indigenous species of trees and shrubs. But major land-use in the study area remains for agriculture. There is no notified eco – sensitive area/ national park/ wild life sanctuary present in the study area of the project.

Socio Economic Environment

The people staying within 1 km surrounding of the plant site have agriculture as their main occupation and source of income but many villagers work as employees/ workers in the industries present in Honad industrial zone. Buffer zone is also not densely populated. Habitation is in small villages which are located at a distance from each other.

Major part of the buffer zone is covered by Hilly area and farm lands. Major source of water for the human activities and agriculture in buffer zone in ground water which is extracted through bore wells or open wells. All the villages in study area and Khopoli have good literacy rate, healthy sex ratio but less percentage of working population. More details are given in Chapter 3 of the EIA report. Villages have all the basic infrastructure facilities such as water, electricity, education and sources of employment.

Risk Assessment

The purpose of this risk analysis report is to analyze and assess the principal risks and hazards associated with the expansion of the Synthetic Organic Chemical Manufacturing plant capacity.

The factory is presently manufacturing the following products –

- Di-acetone alcohol
- Isophorone
- Phosphorus Pentasulphide
- Phosphorus Pentoxide

Under expansion proposal the factory proposes to add the following products –

- Acetone
- Phenol
- Zinc di-organo dithiophosphate (ZDDP)
- Mesityl Oxide
- Hydrogenated compounds

Various possible risk scenarios associated flammability and hazard potentials of some the chemicals mentioned above and of those chemicals that are going to be used as raw materials are discussed further in **Chapter 6** of EIA.

Environment Management Plan

A comprehensive Environment Management plan highlighting in-built environment management features *(as given in pollution control measures above)* and to promote all round growth of the area is prepared. The plan incorporates environment management measures during construction and operation phases. The capital outlay for environmental control & management measures estimated to be Rs. 210 lacs which includes following;

Environmental Controlling Measure	**Capital Investment (Rs. In Lacs)**	**O&M Cost/Annum (Rs. In Lacs)**
Air Pollution Control	90	10
Environment Monitoring	10	10
Waste Minimization System + ETP Up-gradation	85	05
Hazardous waste & Solid waste mgmt	-	10
Green Belt Development	03	02

Occupational Health & Safety	10	05
Social welfare & upliftment	12	10
Total	**210**	**52**

The annual recurring cost of environmental conservation, pollution control and monitoring facilities for the proposed expansion has been estimated to be Rs. 52 lacs/ year.

Project Cost Considerations

The total project cost for the proposed expansion has been estimated to be Rs. 2200 lacs. The capital outlay for environmental control measures estimated to be Rs. 210 lacs.

Prasol Chemicals Ltd. is expected to maintain this capital & annual budgetary allocation and at the end of each year to revise the budget based on previous year's experiences and price/cost changes.