

CONTENTS

Executive Summary	1
1.0 Introduction	1
1.2 Project Description	2
1.3 Project cost and Implementation details	2
1.5 Raw Material Details	4
1.6 Description of Environment	6
1.7 Baseline Environmental conditions	7
1.7.1 Ambient Air quality.....	7
1.7.2 Noise Level	7
1.7.3 Traffic Density.....	8
1.7.4 Water Quality.....	8
1.7.5 Soil Quality	8
1.7.6 biodiversity.....	9
1.7.7 Baseline socio-economic conditions.....	9
1.8 Anticipated Environmental Impact And Management plan	10
1.8.1 Construction Phase.....	10
1.8.2 During Operation Phase.....	13
1.9 Environmental Monitoring Program	18
1.10 Risk Analysis	19
1.11 Conclusion	20

LIST OF TABLES

Table 1: Process Flow Diagram of Dextose	3
Table 2: Process Flow Diagram of Sorbitol	4
Table 3: Raw Material Details	4
Table 4: Anticipated Impacts and Mitigation Measures for Construction Phase.....	12
Table 5: Details of waste water generation.....	14

LIST OF FIGURES

Figure 1 : Map showing study area

EXECUTIVE SUMMARY

1.0 INTRODUCTION

The Rajaram maize products (RMP) were established in 1983 by the founder of the company late shri Rajaram Gupta. Rajaram Maize Products is the only starch unit in Chhattisgarh State. RMP manufactures starch of dextrans, liquid glucose, dextrose mono hydrate, dextrose anhydrous, maltose liquid, high maltose syrups, maltodextrin, corn oil, corn gluten, corn fiber etc. The manufacturing unit is located at Khasra No. 761/1- 4, 760 /1, 745/2, 745/3, Mohad Village, Bhothipar Khurd, Surgi Road, Rajnandgaon in Chattisgarh covering 16.02 acres land. The study area is shown in Figure 1.

The RMP unit has planned for expansion of existing maize based products from 120 MT/day Maize Grinding to 300 MT/day Maize Grinding. It also proposes setting-up 20 MT/day Sorbitol manufacturing facilities from Dextrose slurry in the existing premises. For this, M/s. SGS India Private Limited (hereinafter referred as SGS) Gurgaon, has been engaged by RMP to carry out an Environment Impact Assessment (EIA) study and to prepare an Environment Management Plan (EMP) for the proposed expansion. The study has been carried out as per the guidelines of Ministry of Environment and Forests (MoEF).

This expansion project is designated to be developed under the Environmental Impact Assessment (EIA) Notification and amendments under Environment (Protection) Act, 1986 and falls under "Category A (activity 5f)" as per the notification issued on 14th September 2006 by MOEF.

The EIA report termed as draft report is prepared based on the Terms of Reference (TOR) prescribed by MOEF for public hearing. TOR was prescribed by MOEF vide F. No.J-11011/207/2012-IA II (I) dated 11th January, 2013 on the basis of duly filled Form-1 which was submitted 27th April 2012 and subsequently presentation was made to appraisal committee of MOEF on 30th October 2012.

As per the TOR prescribed by the MoEF, the ensuing report termed as 'Draft EIA Report', has been prepared to submit Member Secretary, Chattisgarh State Pollution control Board to carry out public hearing.

Location and Accessibility

The details of location of the existing site are provided below.

Latitude: N 21° 02' 13.40"

Longitude: E 81° 04' 11.80"

The existing plant is located at ~7 km from the National Highway 6 (NH 6) in North direction from the site. The nearest residential area is Bhothipar Khurd which is about half a kilometer towards west direction from the project site. The nearest railway station is at Rajnandgaon, which is about 7.5 km in NNW from the site. Many important trains ply on this route which connects Gujarat, Maharashtra, in the west & Orissa, West Bengal in the east. Raipur, the capital of Chattisgarh is situated at a distance of 65 km from the site. The nearest airport is at Raipur.

1.2 PROJECT DESCRIPTION

Total plot area of the existing unit is 16.02 Acres. Expansion will take place in existing land only. No additional land is required for Proposed Expansion. The unit has raw material storage facility, utilities, production area & effluent treatment plant (ETP). The proposed project will involve construction of new building for manufacturing of additional 180 MT/day of Maize grinding and construction of New Sorbital Plant within the existing premises.

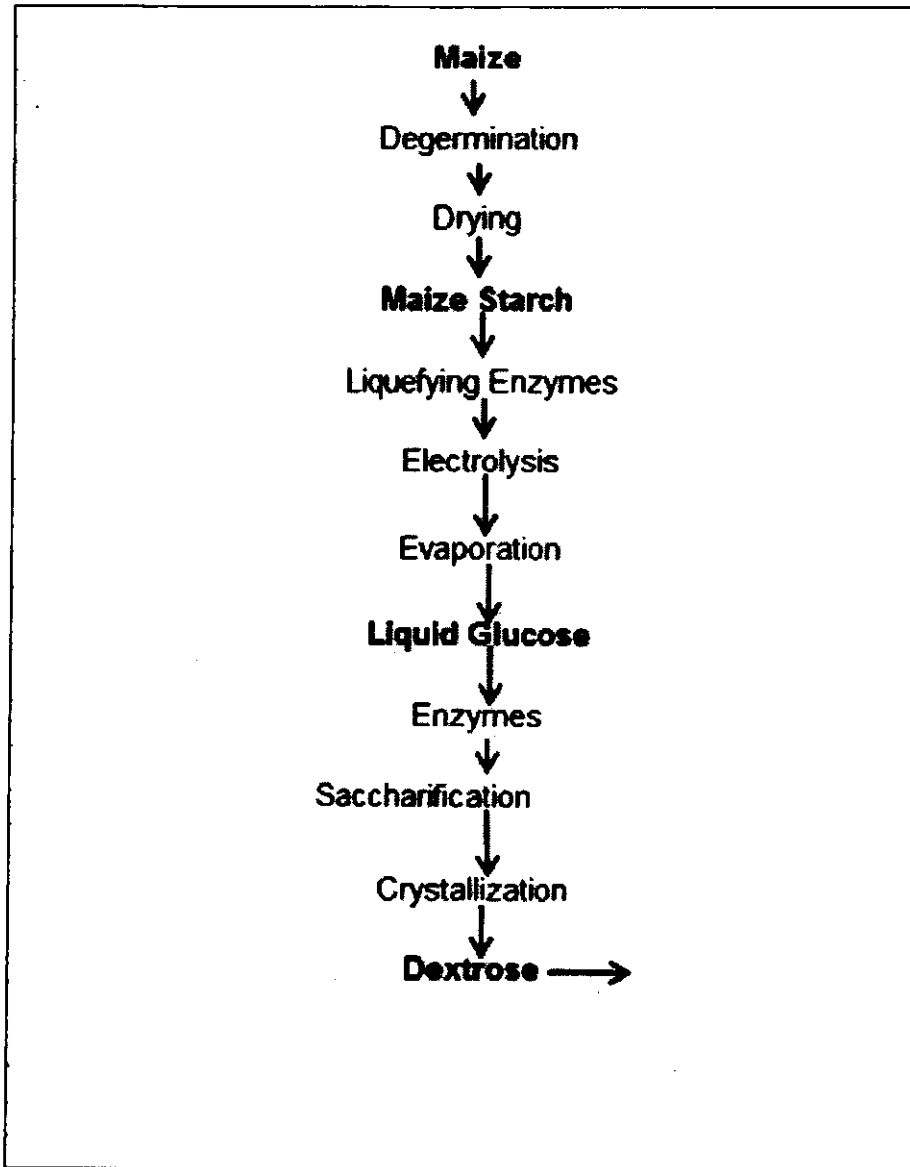
1.3 PROJECT COST AND IMPLEMENTATION DETAILS

The estimated cost for the proposed expansion and addition of new Sorbital plant is Rs.23.42 Crores. Total capital cost is estimated Rs 407 Lakhs and recurring cost is estimated as Rs 96 Lakhs per annum for implementation environmental protection measures. The project is scheduled to be commissioned after obtaining required regulatory permits.

1.4 PROCESS DESCRIPTION

The process of manufacturing starch of dextrins, liquid glucose, dextrose mono hydrate, dextrose anhydrous, maltose liquid, high maltose syrups, maltodextrin, corn oil, corn gluten, corn fiber details are provided in the process flow diagram as given in the below table no.1.

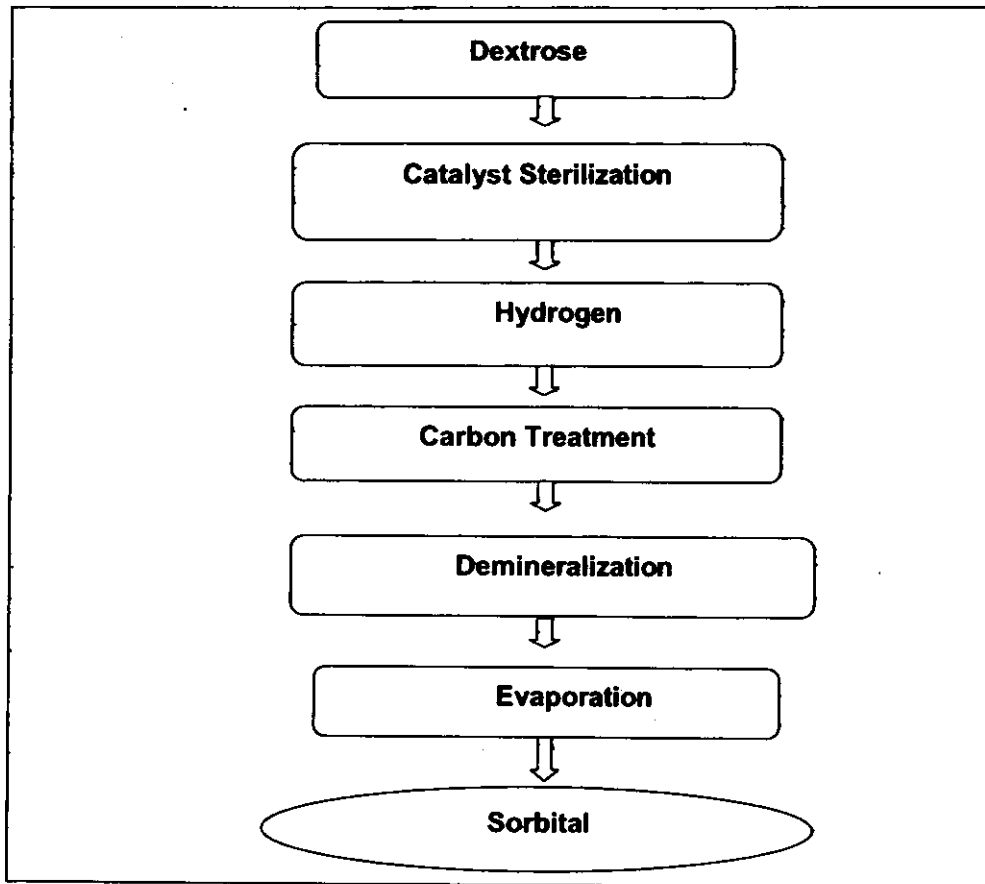
Table 1: Process Flow Diagram of Dextrose



Manufacturing Process of Sorbitol

The manufacturing process of Sorbitol will involve the following basic steps given in Table 2. Hydrogen gas will be required for Sorbitol manufacturing. 100 m³/hr capacity hydrogen plants shall be installed to produce Hydrogen gas at the plant. Hydrogen stored in low pressure hydrogen gas holder. Hydrogen gas shall be handled through two banks of 80 numbers of Cylinders each. Hydrogen gas carrying capacity of each cylinder is 28 m³. Total hydrogen storage capacity is 4480 m³.

Table 2: Process Flow Diagram of Sorbitol



1.5 RAW MATERIAL DETAILS

The details of Raw material are as follows mentioned in Table 3

Table 3: Raw Material Details

Maize Based Products							
Maize	120 MT/day	180 MT/day	300 MT/day	8-10 Trip/day	12-15 Trip/day	20-22 Trip/day	Nearby field and villages
(Truck of 15 Tons capacity)							
HCL	20 kl/month	30 kl/Month	50 kl/Month	2 Tankers/Month	Tankers/Month	4-5 Tankers/Month	Nearby Chemical Industry /local supplier
(Tankers of 18 -20 KL capacity)							

HNO3	300 Liters/Month	450 Liter /Month	750 Liters/Month	10-20 Drums/Month	25-30 Drums/Month	40 - 50 Drums/Month	Nearby Chemical Industry/ local supplier
				(in Truck, Drum of 20 Liter Capacity)			
Sorbital							
Dextrose Slurry	-	15 MT/day	15 MT/day	Pipeline			Will be available at the plant
HCL	-	720 Kg/day	720 Kg/day	By road through tanker.			From local or nearby supplier
NaOH	-	400 kg/day	400 kg/day	By road			From local supplier
Rainy Nickel	-	20 kg/day	20 kg/day	By road			From local supplier
Soda Ash	-	20kg/day	20 kg/day	By road			From local supplier

Water Requirements and Source: The total requirements of water after expansion will be 690 KLD, out of which for proposed expansion project, 310 KLD of water will be consumed. Most of time water shall be drawn from Shivrath River. There are 5 numbers of bore well in the plant with yield of 50 KLD. Water from these bore wells are used for drinking purpose. River water is treated with alum and polymer resin before going to process.

Power Requirement: Total power requirement after expansion shall be 3000 kVA and same will be met through husk fired power plant at existing plant and grid power of Chhattisgarh State Electric Board (CSEB). The power backup by two DG sets of 625 kVA and 125 kVA capacity are already available at the existing plant.

Steam Requirement: There are total 4 boilers. In one boiler, 3 TPH boiler coal (0.5ton/hour) is used as fuel, where as in other 3 boilers i.e., 6 TPH, 10 TPH and 15 TPH, rice husk is used as fuel. The Total requirement of rice husk is 7.5 Ton/hour, the existing requirement is 4.0 Ton/hour, and for the proposed expansion is 3.5Ton/hour.

For existing operation only, 15 TPH or (6 TPH+10 TPH) boilers are used. All four boilers are not used at a time. After expansion all 3 boilers will be used.

1.6 DESCRIPTION OF ENVIRONMENT

A study area of 10 km radius around the existing plant has been considered for the study of existing environment. The findings of study are summarized below:

No Reserved Forest, Protected forest and Wildlife Sanctuary/ National Park are present within the study area;

The existing water bodies are as follows:

Shivnath River- Perennial river at distance of ~ 1.0 km in North direction

Kharkhara Nadi- Seasonal stream at a distance of 4.7 km in South East direction

Ranisagar Lake~7.0 km in NW

Shivnath canal at a distance of 2.3km in North direction

The major habitation is at Rajnandgaon town situated at a distance of 7 km in NNW direction from the existing plant

Approximately 50% of the study area is covered by crop land and 31.1% by fallow land. Major crops are paddy, wheat and maize as observed during field visit. The surrounding features of up to 10 km area do not have any reserve forest and any sensitive features and neither have any archaeological sites.

Topography of the study area - the study area having an elevation varying from 284 to 330 m above the mean sea level. The higher elevation (330 m) and undulated landforms was noted in south western direction. The general slope of the area is from north east to south eastern direction. There are no high mountain ridges. The area falls within the rain shadow area, is relatively flat, constituting the low ranged dry Zone.

The major river, passes through the study area is Shivnath river, one of the tributaries of River Mahanadi. Two seasonal, streams, Kharkhara Nadi and Pari Nadi joins the Shivnath river. These seasonal nallah drain the surface runoff from surrounding areas and seepages finally drain to Shivanth river. The drainage pattern noted to dendrite 1st order type.

1.7 BASELINE ENVIRONMENTAL CONDITIONS

Baseline environmental studies for various environmental attributes were carried out during the months, 4th December 2012 to 5th March 2013 covering winter season.

1.7.1 AMBIENT AIR QUALITY

The ambient air quality monitoring for PM10, PM2.5, SO2 and NO2, CO, VOC, and NH3 were carried out at six (06) locations in order to assess the present air quality of the study area and its conformity to standards specified by CPCB. Monitoring was conducted at a frequency of twice a week at each station for 24 hours for three months. The baseline air quality found to be as follows-

The concentration of PM10 and PM2.5 varied from 35.7 to 69.4 $\mu\text{g}/\text{m}^3$ and 17.7 to 35.5 $\mu\text{g}/\text{m}^3$ respectively.

Concentration of SO2 varied from 5 to 7.7 $\mu\text{g}/\text{m}^3$ and NO2 varied from 12.2 to 25.1 $\mu\text{g}/\text{m}^3$ respectively.

Concentration of CO varied from 218 to 550 $\mu\text{g}/\text{m}^3$ which found to be far below the prescribed standard of 4000 $\mu\text{g}/\text{m}^3$ and the concentration of ammonia found to be below 10 $\mu\text{g}/\text{m}^3$ at all monitoring locations except at the plant site where concentration found to be 22.6 $\mu\text{g}/\text{m}^3$ which is also far below the prescribed standard of 4000 $\mu\text{g}/\text{m}^3$.

Concentration of VOC found to be below 0.1 $\mu\text{g}/\text{m}^3$ at all monitoring locations.

It is observed that the all the monitored parameters found to be below the standard prescribed by CPCB for residential area.

1.7.2 NOISE LEVEL

Ambient noise monitoring was carried at residential zone of six (06) villages surrounding the plant site. The Equivalent sound pressure level (Leq) during day time was reported to be ranged between 47.4 to 60.8 db (A) and 41.3 to 46.6 db(A) during night time. The day time sound pressure level found to be maximum at project site i.e., 60.8 dB(A), which is less than the prescribed norm of 75 dB(A).

1.7.3 TRAFFIC DENSITY

The movement of maximum number of vehicles i.e. peak hours found to be from 8 to 9 am during morning and from 5-6 pm during evening. Two/Three wheelers contributed the highest percentage to traffic density, followed by Non- motorized vehicles at Arjunda road which is situated at a distance of 100 m towards southwest direction from plant site. This road is primarily used by the plant for their transport of raw materials, product by road through trucks and tankers. The width of the road is approximately 4 meters.

1.7.4 WATER QUALITY

To assess the water quality within the study area, total 9 water samples were collected, out of which three (03) are from surface water & six (06) ground water samples and analysed for the physicochemical parameters and compared with to IS: 10500 (Indian Standards/Specifications for Drinking Water), to evaluate their suitability for drinking purpose in absence of main source.

The analysis results of ground water samples show except total hardness, TDS, Iron and alkalinity, rest all parameters conform to the standards IS 10500.

The surface waters collected from nearby surface water bodies show little higher concentration in Turbidity, suspended solids and oil & grease and rest of the parameters conform to the standards of IS2296 Class C norms (Surface water standards).

1.7.5 SOIL QUALITY

The analysis of soil quality was carried out to assess the existing soil quality status by collecting grab soil samples from three (03) villages(Near project site, Bhothipur Khurd and Mohar) falling within the study area. The soil texture in the study area is mainly clay in nature. The concentration of alkalinity ranged from 619.0 to 388.9 mg/kg. It indicates the presence of calcium carbonate in the geology such as limestone and others carbonate rocks. The presence of heavy metals like Zinc, Cadmium, Lead and Chromium is found in the soil samples as follows, concentration of Zinc and Lead concentration ranged from 30.01 to 25.26 mg/kg and 13.8 to 16.9 mg/kg respectively, the concentration of Cadmium and Chromium ranged from less than 1 to 1.68 mg/kg and 18.94 to 46.62 mg/Kg respectively. The concentration of

organic content found to be less i.e. varied from 0.34% to 0.09 % which ultimately decreases the moisture content of soil, therefore moisture content found up to 20 % in the study area. The available nitrogen is ranged from 353.47 to 292.01 mg/kg in the soil samples.

1.7.6 BIODIVERSITY

No forest areas (reserved and protected) exist within 10 Km of the study area. A small portion of Chhindi bihiri reserved forest area falls within the 15 km radius of the study area. No rare and endangered species were found within the study area. The unit is also surrounded by farming lands owned by the project authority where maize is grown for the unit itself. In some area standing crops were also observed. Mostly the farmers are growing fast growing trees such as Albizzia lebbeck, Albizzia procera, Terminalia arjuna, Acacia Arabica, Azadirachta indica along the bunds of the farming lands. No wild mammalian species was directly sighted during the field survey. From the primary survey, a total of 26 species of avifauna were identified and recorded from the study area. Other than common garden lizard, no other reptilian species was encountered directly during the field survey. The existing landscapes especially the croplands and herbaceous ground cover provide suitable habitat for the butterflies in and around the proposed project site. Dialogue with the local villagers confirmed the presence of fishes such as Rohu and Catla in the shivnath river. No fishing activities are observed in the river.

1.7.7 BASELINE SOCIO-ECONOMIC CONDITIONS

The study area, which includes total 61 villages comprise of 41 villages of Rajnandgaon district and 20 villages of Durg district. Total population of the study area is 2,07,461 includes (63691 rural and 143770 urban) with 11711 residential households. Percentage of scheduled caste and schedule tribe population is 6.75% and 13.05%, respectively. The rural literacy rate is 66.64% (male literacy stands at 55.85% and while female literacy is at 44.15%), which is lower than district literacy rate i.e. 76.97%. However, urban area shows good literacy rate ie.71.72% which is just same as of Chattisgarh state literacy rate ie. 71.0%. This implies that Rajnandgaon town is well developed with all primaries as well as higher educational facilities. The occupational pattern of rural area shows that the percentage of main, marginal and non workers is 42.68%, 9.62% and 47.70% respectively. The main workers constitute majority of cultivators followed by agricultural labors, others and

household labors. However, Rajnandgaon urban constitute main workers (32.66%), marginal workers (22.62%), and non workers (64.72%).

1.8 ANTICIPATED ENVIRONMENTAL IMPACT AND MANAGEMENT PLAN

The proposed expansion of Rajaram Maize Products (RMP) will have impact on soil, water resources & water quality, ambient air quality, noise, ecology and socio-economic environment in surrounding area due to the generation, handling and disposal of stack emissions, liquid effluents and solid wastes during construction and operation phase.

1.8.1 CONSTRUCTION PHASE

The impacts with mitigation measures are given in below Table 4.

Table 4: Anticipated Impacts and Mitigation Measures for Construction Phase

S. No.	Anticipated Impacts	Mitigation Measures Proposed
Ambient Air Quality		
i	During excavation work and filling of foundations, dust and exhaust gas emissions at the site will be generated due to the manual and mechanized excavation and movement of vehicles transporting construction material may also result in air pollution.	Treated water from existing plant will be sprayed on construction site to reduce dust emission as per requirement. Vehicles with 'pollution under control certificate' will be engaged in construction activities. Construction machines and equipment will be maintained as per schedule to reduce emissions.
ii	During plain concreting, RCC, civil foundations and erection activities, emissions of fine cement dust along with other exhaust gas emissions will be generated by vehicle movements, concrete mixing, etc.	Concrete mixing will be done at isolated place. The construction workers will be provided with appropriate protective equipments, wherever, high particulate emissions are expected.
iii	Fumes and gases near the work area due to welding activities.	Training in welding or use of competent staff. PPE's will be used during welding. Work will be alternating, hence impact of temporary nature.
iv	During coating and painting, emissions in the form of mainly	Emission will be temporary in nature and for short duration and limited to only construction

S. No.	Anticipated Impacts	Mitigation Measures Proposed
	solvent fumes and aerosols will be generated due to surface treatment, coating and painting activities.	phase.
(2.)	Soil and Surface & Ground Water Quality	
i.	<p>Turbidity and suspended solids in runoff from excavated area will be increased and which will ultimately impact the nearby water body. However, this impact will be confined to first rain as loose soil will be compacted and stabilized after rain.</p> <p>Possibility of contamination of soil, surface and ground water due to spillage of fuel oil from storage, vehicles and construction machines, etc.</p>	<p>Excavation of foundation should be done in non-rainy season.</p> <p>Loose soil will be compacted after refilling so that, soil erosion and consequent soil impact can be avoided.</p> <p>The contamination of soil, surface and ground water will be avoided by storing fuel on concrete floor.</p> <p>Vehicle and construction machines will be parked on cemented ground.</p>
ii.	<p>Spillage of coating material, painting waste containing heavy metals and hazardous substances.</p> <p>Spillage of coat and wrap materials, scales, cuttings and scrap materials.</p> <p>Generation of waste empty drums of solvents, paints and coat wraps materials</p>	<p>Care will be taken to avoid direct contact and spillage of these materials with ground during coating and painting operations. It is suggested to cover ground with protecting sheets to avoid damage to soil, surface and ground water.</p>
(3.)	Noise	
i	<p>Noise will be generated mainly due to operation of construction machines during excavation, plying of vehicles, electrical vibrators for concreting, concrete mixers, etc.</p>	<p>The vehicles and construction machines will be maintained as per schedule with the standard limiting noise output.</p> <p>Vehicles and construction machines with silencers and mufflers will be allowed at the site.</p> <p>Wherever this cannot be achieved the area will be earmarked as high noise level area requiring use of ear protection gadget.</p>
ii	<p>During concreting, RCC civil foundations and erection</p>	<p>Noise from construction vehicles and equipments will not be continuous and will be</p>

S. No.	Anticipated Impacts	Mitigation Measures Proposed
	activities, noise will be generated mainly due to vibrators, breaking, cutting, plying of vehicles, welding machines, operations of cranes etc.	during daytime. Workers nearby to be provided ear-plugs.
iii	Noise will be generated due to grinders, fabrication, cutting, plying of vehicles, welding machines, etc.	Noise from construction vehicles and grinders, fabrication, cutting, equipments will not be continuous and will be during daytime. Workers nearby area to be provided ear-plugs.
4.	Ecology	
i.	The proposed site for expansion is free from trees and shrubs. Therefore, no impact is anticipated during construction phase.	No mitigation measure is suggested for ecology during construction phase of the proposed expansion,
5.	Socio-economic impacts	
i.	Workforce arrangement for construction activities.	Local workers will be employed as far as possible. Drinking water to be supplied through existing drinking water sources at the plant. Ground and surface water pollution due to domestic waste from construction activities will be avoided by providing proper handling of domestic wastes.
ii.	Deployment of construction labour	The RMP is existing plant and most of the workers belong to local areas. Semi-skilled and unskilled workmen are already available in the area. During construction phase, local population will get employment opportunities, Secondary employment will also be generated due to the project which will enhance the income of surrounding population.

However, these impacts are expected to be temporary in nature that will subside once Construction period is over.

1.8.2 DURING OPERATION PHASE

The proposed expansion of the existing plant of RMP may have adverse impact on surrounding environment in a number of ways in the absence of mitigation measures. Therefore, mitigation measures and environmental management plan have been suggested for environmental components likely to be affected. Brief description of the same is given below. Mitigation measures for operation phase are described in Environmental Management Plan section. The properly prepared management plan will help in proper planning for implementation and monitoring the environmental parameters at the plant site in the study area and identify critical parameters for timely corrective actions.

Land Environment -

One of the activities with large potential effects on soil and groundwater is the disposal of waste on land. When waste material is disposed off on land, rainwater and surface run-off may percolate through the material and carry contaminants into soil and Groundwater. Change in soil surface and soil properties may have impacts on soil microorganisms, natural and cultivated plants and animals.

Environmental management plan for soil are described below:

All liquid effluent shall be collected treated appropriately in well designed ETP and recovered treated waste water shall be utilized completely for gardening purpose.

75 litre/year, used oil generated from maintenance of DG Sets shall be collected in drums and given to SPCB/CPCB approved waste oil recyclers for treatment and reuse.

Minimization at all levels shall be attempted to reduce the wastes, empty containers (which are rare), packing surpluses, unloading spillages, etc.

1.5 kg/year Nickel Catalyst generated from proposed Sorbitol plant shall be stored in wet pit at isolated place and same shall be taken back by supplier for recycling.

7 TPD of fly ash generated from husk fired boilers shall be sold to nearby brick manufacturing plant and given to agricultural fields in surrounding area.

Hence, the impact on land environment due to the proposed project shall be marginal.

Water Environment -

After expansion of existing plant and from new Sorbital plant, effluent shall be generated from the process, domestic and utilities as given in below Table 5.

Table 5: Details of waste water generation

Description	Wastewater Generation (KLD)		
	Existing	Proposed	Total
Domestic	18	8	26
Boiler blowdown	15	10	25
Process	220	150	370
Sorbital Plant	-	24	24
Total	253	192	445

Wastewater Management Plan is described below:

Effluent generated at the plant shall be treated in well designed ETP. Existing ETP will be capable to treat the additional effluent generated after expansion. Treated effluent from secondary system after confirming Chhattisgarh Pollution Control Board Pollution Control Board Norms, shall be used in gardening and which will in turn reduce the quantum of fresh water requirement.

RMP Plant has as comprehensive and efficient system for treatment and management of all liquid/solid wastes; therefore, there is less possibility of contamination of either surface or ground water.

Regular monitoring of treated waste water will ensure effectiveness of treatment systems.

Rain Water Harvesting

It is proposed to install an effective Rain Water Harvesting system at the plant. Harvested rainwater shall be injected in shallow ground water aquifers for proper dispersal, recharge and storage in these aquifers for domestic users of area surrounding RMP Plant. Total 8 rain water harvesting structures are proposed at the plant.

Air Environment -

During operation phase, following will be sources of emissions from the existing and proposed expansion of RMP:

Dust from maize cleaning.

Particulate Matter, NO_x & SO_x emissions from boilers.

To evaluate the impact of stack emission from the RMP plant after expansion on ambient air quality of the area, mathematical dispersion modeling was carried for obtaining short-term incremental ground level concentration (GLC) isopleths, Industrial Source Complex Model (ISC-ST3) developed by USEPA was used. The 24-hourly predicted incremental GLC values from husk fired boilers stacks as it was found to be continuous sources of emissions as follows;

NO_x (0.0 – 13.6 µg/m³), SO_x (0.0 – 12.3 µg/m³) and PM (0.0 – 7.5 µg/m³) added together with 24-hourly baseline values of NO₂ (12.2 – 25.1 µg/m³), SO₂ (5.0 – 7.7 µg/m³) and PM₁₀ (35.7 – 69.4 µg/m³) remain below the 24-hourly ambient air quality standards of 80 µg/m³ for SO₂ & NO₂ and 100 µg/m³ for PM₁₀ in industrial, rural, residential and other areas, there will not be any significant impact on the Air Quality.

Air Pollution Control Systems -

In maize cleaning process, dust containing air is passed through cyclone and bag filters to capture dust before venting air into the atmosphere. Boilers are fitted with separate dust collectors to capture particulate matters before venting stack gases into the atmosphere.

DG sets will also be source of emissions; however, DG sets shall be operated only in emergency during grid power failure. Emissions from DG sets are vented into the atmosphere through 5.5 m and 2.5 m high stack above roof. Therefore, no impact is anticipated on air quality due to DG set emissions.

From the existing and after expansion of RMP plant, husk fired boilers will be the dominant and continuous source of particulate emissions. Therefore, efficient air pollution control systems have already installed with boilers at the RMP plant.

Control of Fugitive Emissions -

Fugitive emissions at the plant will be generated from following sources:

Truck transportation of fuels (rice husk) to storage yards, fly ash transfer point in fly ash storage bunker, air blown dust from ash storage ponds and handling of raw materials

Utilizing metal roads with covered transportation of husk to the storage yards for reduce generation of dust emission. Fuel feeding and vibratory feeder system have been designed to have minimum fugitive emissions.

Waste Management -

Solid Waste Management

The solid waste generation from the plant is Fly ash (7 TPD) generated by rice husk combustion from husk fired boiler. It shall generate mainly fly ash and essentially no bottom ash.

Rice husk fly ash shall be sold to nearby brick manufacturing plant and given to agricultural fields in surrounding area. Moreover, it is in considerable demand by brick manufactures in the area and farmers in the villages surrounding because the soil of the area is devoid of organic carbon and rice husk fly ash has sufficient unburnt organic carbon to make soil humus as well as to provide micro and secondary nutrients.

Hazardous Waste Management

Hazardous Waste proposed to be generated at the plant after expansion shall be managed in following ways:

Used oil generated from maintenance of DG sets shall be disposed as per Hazardous waste management regulations.

75 litres /year used lubricating oil generated from the plant after expansion shall be sold to SPCB/CPAB registered used oil recycler.

Nickel Catalyst (1.5 kg/year) generated from proposed Sorbital plant will be stored in wet pit at isolated place and same shall be taken back by supplier for recycling.

Effluent, fly ash and hazardous wastes generated from the RMP plant after expansion may contaminate land at and around the plant, if not disposed in environmental sound manner.

Noise Quality -

During operation of the plant after expansion, the only major continuous source of noise during plant operation shall be boilers, since DG sets shall operate only during

grid power failure. The noise level may, however, exceed the above limits for a short period during start-up of industrial DG sets.

Environmental management measures to control the noise levels are as given below:

Acoustic enclosures have been provided to DG sets as per the guidelines of Central Pollution Control Board to control the noise level. Efforts shall be made to ensure that noise outside acoustic enclosures does not exceed 75 dB (A).

Boilers are installed in shed with side wall, which works as noise barriers.

Ear Muff and ear plug have been provided to the personnel deployed at DG sets and boilers area.

Plantation on periphery and boundary wall also act as noise barrier and attenuate noise levels.

Green Belt development -

RMP will plant trees around the periphery of the constructed area and around the boundary of the site area. Existing 1.2 Acres of land has been used for green belt and after expansion total green belt area would be around 4.5 Acres. In view of the different functional requirements of the plant in an industrial area, the pattern of plantation around the RMP plant shall be under curtain, avenue, field and ornamental plantations. Species planted at the plant shall be decided in consultation with horticulturalists and native species (as far as possible) shall be planted. In order to maintain bio-diversity, a mixture of species shall be selected for green belt. Treated waste water well within the prescribed limit shall be used for watering the green belt area at the plant.

Plantation for Odour Control: It is suggested that shrubs/creepers which give fragrance, namely, Rat ki Rani, Rajni Gandha, Harsingar, Juhi, Champa, Chameli, Mogra and Taberose may be planted at appropriate locations at the plant. Fragrance generated by the plantation of these species will help in making the unpleasant odor of chemicals to a large extent.

Socio-economic Environment -

RMP plant shall provide employment to 226 persons directly and many will be indirectly employed in the plant, when the power plant goes into operation. Indirect benefits will also accrue to a large extent around the project site. The project

proponent not only believe in the development of project area and their employees but also in the socio-economic growth of its neighborhood by taking up several welfare activities which would help improving the environment with significant growth in the socio-economic status. The existing RMP is into the various CSR activities as given below, in the surrounding area and will continue to do the same.

For awareness of Family Planning, Rajaram Maize products working jointly with Red Cross Society and giving cash benefit to beneficiary around Rs. 20 Lacs/ year

RMP providing Mid day meal to around 3000 students of Govt. School through Akshay Patra Bhilai – Rs 20 Lacs/year

Construction of Sulabh Shauchalaya (Common Public Toilet) in Haldi village – Rs. 7 Lacs

Construction of Cement Road in Bhothipar Khurd – Rs. 2 Lacs

Construction of Sulabh Shauchalaya (Common Public Toilet) in Mohad village – Rs. 7 Lacs

1.9 ENVIRONMENTAL MONITORING PROGRAM

Sr No.	Parameter	Frequency
1	Ambient Air Quality	Three ambient air quality locations in dominant wind directions at a distance up to 3 km from stack(s) should be used for monitoring ambient air quality (PM10, PM2.5, SO2, NO2 and CO) for two consecutive days every six monthly by competent MoEF/NABL approved lab.
2	Source emissions	Regular in house stack monitoring of SPM, SOx and NOx concentrations in emissions from the Husk fired boiler stacks. A regular stack monitoring is recommended for proper control of stack emissions. Half yearly stack emissions monitoring is also recommended for counterchecking by competent MoEF/NABL approval laboratory.
3	Ground Water Quality	Ground water quality of tube wells/hand pumps lying close to RMP plant shall be monitored every year at the end of summer season for parameters specified under IS: 10500, 1991.
4	Waste Water	pH, TSS, BOD, COD, Oil & Grease, shall be monitored in treated waste water daily at ETP Laboratory while Chlorides, Sulphates, Phosphates and Fluorides, Iron and Heavy Metals (Hg, Cd, Cr, Pb, Zn, As, Cu) should be analyzed annually by outside agency of repute.
5	Noise Levels	Noise levels in the work zone environment such as, boilers, D.G. sets and other high noise areas shall be monitored every six months. Noise monitoring shall also be taken at the periphery of the plant so as to establish the effect of the plant's operation on the surrounding of the plant.

		The above monitoring programs can be further reviewed as per the need arising in the plant.
6	Soil Quality	During construction and operation phases of the proposed expansion of the plant, soil may be contaminated if suitable mitigation measures are not taken for disposal of solid and hazardous waste and effluent. Therefore, composite samples of soil shall be collected and analyzed annually during operation phases of the plant after proposed expansion.
7	Occupational Health Check-up	Occupational Health check up, especially for diseases of eye, ear and chest for concerned personnel shall be carried out yearly.

RMP shall create an Environmental Management Cell (EMC) to look after the needs of proposed plant after expansion.

1.10 RISK ANALYSIS

At the existing plant High Speed Diesel (HSD), Hydrochloric Acid (HCl) (30 %) and Nitric Acid (HNO₃) are stored which are hazardous in nature. After expansion of RMP, hydrogen gas and Sorbitol will be produced, handled and stored at the plant. High Speed Diesel and hydrogen gas are flammable while Hydrochloric Acid (HCl) (30 %) and Nitric Acid (HNO₃) are toxic and corrosive liquid. In the event of release of HSD due to catastrophic rupture of 20 kl tank, fixed pool shall be formed as dyke around the tank for loss of containment. On getting source of ignition pool fire will take place and thermal radiation of 4 kW/m² intensity shall reach up to 26.2 m distances. In the event of rupture in hydrogen gas piping followed by ignition, jet fire shall take place and the thermal radiation of 4 kW/m² intensity shall occur at 68.2 m distance. To reduce the risk and enhance the safety at the plant, safety and risk mitigation measures including safety education & training, preventive maintenance, safe operating procedures, work permit system, accident reporting, safety inspections & internal audit, fire protection measures, communication system, colour coding system, electrical safety will be followed.

For an event of emergency, disaster management plan has been prepared and role and responsibilities have been defined for all key personnel involved in emergency planning to combat the emergency.

1.11 CONCLUSION

Environmental Impact Assessment studies carried out for the proposed expansion of Rajaram Maize Products (RMP) indicate that mild environmental impacts are anticipated during construction and operation phases, those can be mitigated by implementing suggested mitigation measures and environmental management plan. The proposed expansion shall have long term positive impact socio-economic condition of the area as a result of increased employment opportunities, better assured price for maize crop to farmer of the area and by implementation of Corporate Social Responsibility (CSR) measures in the area.

