

Sequent Scientific Limited

Executive Summary

For Proposed expansion of Bulk Drugs &
Intermediate Unit

at

Toremavu village, Nanjangud Taluk, Mysore
District, Karnataka

CATEGORY 'A' - SCHEDULE 5(f)

Prepared by

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EXECUTIVE SUMMARY

1.0 PROJECT DESCRIPTION

M/s. Sequent Scientific Limited is a widely acknowledged name in the pharmaceutical and chemical industries, with a history of over 13 years of manufacture and innovation in active bulk drug ingredients (API). Ever since inception in 2002 Sequent has emerged as an integrated pharmaceutical company with a global footprint, operating in the domains of Animal Health (API and formulation) and Human health (API). Sequent has acquired a bulk drug and Intermediate Manufacturing unit located at Torenavu village, Nanjangud Taluk, Mysore District, Karnataka from M/s. Arvee Synthesis Private Limited. The current project is for the replacement of existing 4 products with 5 new products API (Active Pharmaceutical Intermediates) and capacity enhancement from 200.2 MTPA to 448 MTPA.

In order to assess the environmental impacts due to the proposed project, Environmental Impact Assessment (EIA) report has been prepared. As per the latest Environmental Impact Assessment Notification dated 14th September 2006 and its subsequent amendments, Synthetic organic chemicals industry located outside notified industrial estate, falls under category 'A' under project type 5(f) and requires Environmental Clearance (EC) to be obtained from MoEFCC. In line with EIA Notification dated 14.09.06, EAC meeting was held in during 17th- 19thFebruary, 2015 for determining the TOR and preparation of EIA/EMP report. Based on TOR conditions given by MoEFCC vide its letter No. J-11011/20/2015-IA.II (I) dated 30.04.2015, this EIA has been prepared.

1.1 Project Proposal

The proposed project involves change of product mix and capacity expansion by discontinuing the existing 4 products of quantity 200.2 MTPA and to produce 5 new products of quantity 448 MTPA. This will be done with minor modification in infrastructure. Total capital investment on the proposed expansion project is about Rs. 25.5 Crores. The list of products manufactured in existing plant along with proposed products with their production capacities are tabulated in **Table - 1.1**.

TABLE 1.1 – DETAILS OF THE PRODUCTS (EXISTING AND PROPOSED)

S. No.	Name of Product	Existing (TPA)	Proposed (TPA)	After Expansion (TPA)	Remarks
Existing Products					
1	Azacyclonol Base	60	-60	0	Manufacturing of these products will be discontinued.
2	Di BenzoSuberone	63	-63	0	
3	ISO Nipecotic Acid	54.8	-54.8	0	
4	ISO Nipecotic Acid Ethyl Ester (INEE)	22.4	-22.4	0	
Proposed Products					
5	Buparavaquone	-	12	12	New products proposed for manufacturing.
6	Praziquantel	-	300	300	
7	S-Methoprene Ammonium Salt	-	12	12	
8	Ractopamine Hydro chloric Acid	-	24	24	
9	Calciumphosphoryl choline chloride	-	100	100	
Total		200.2	448	448	

1.1.1 Land Requirement

The total area for the existing unit is 14.59 acres. Details of the Land use break up for the existing and expansion project are given in Table 1.2.

TABLE - 1.2: LANDUSE BREAK-UP

S. No.	Particulars	Area in Sq.m			Percentage (%)
		Existing	Proposed Additional	After Expansion	
1.	Process building area	1849.24	1161.46	3010.7	5.13
2.	Non- process building area	16.72	-	16.72	0.03
3.	Roads & pathways	21.34	-	21.34	0.04
4.	Green-belt area	19488.55	-	19488.55	33.00
5.	Parking Area	355.25	-	355.25	0.60
6.	Storage Area	486.44	-	486.44	0.82
7.	Vacant area	36838.68	-	35677.22	60.38
Total plot area		59056.22	-	59056.22	100.00

1.1.2 Raw Material Requirement

The raw materials required for the manufacture of products proposed after change of product mix along with the list as per MSIHC rules are tabulated below in **Table - 1.3**.

TABLE - 1.3 : RAW MATERIAL REQUIREMENT DETAILS

S. No.	Raw Material	Requirement (TPM)	Source	List as per MSIHC Rules, 2000
1.	2-bromo-p-hydroxy-acetophenone	1.62	Indigenous	-
2.	4-tert-butyl-cyclohexanone	0.75	Indigenous	-
3.	7-Methoxy-Citronellol	0.95	Indigenous	-
4.	Acetic acid	3.78	Indigenous	Schedule I – Part II No. 2
5.	Acetonitrile	3.15	Indigenous	Schedule I – Part II No. 7
6.	Acetone	3.20	Indigenous	Schedule I – Part II No. 4
7.	Activated Charcoal	0.02	Indigenous	-
8.	Ammonia (gas)	0.28	Indigenous	-
9.	Aq. Ammonia	2.55	Indigenous	Schedule I – Part II No.31
10.	Azoisobisbutyronitrile	0.02	Indigenous	-
11.	Benzyl amine	16.07	Indigenous	-
12.	Calcium carbonate	6.34	Indigenous	-
13.	Calcium hydroxide	1.33	Indigenous	-
14.	Caustic lye 50%	15.16	Indigenous	-
15.	CDMA	15.75	Indigenous	-
16.	Choline chloride	5.34	Indigenous	-
17.	Chloro acetyl chloride	14.25	Indigenous	-
18.	Conc. HCl	1.06	Indigenous	-
19.	Con.H2SO4	1.54	Indigenous	Schedule I – Part II No. 591
20.	Ethyl acetate	5.00	Indigenous	Schedule I – Part II No. 247
21.	Hexane	18.85	Indigenous	Schedule I – Part II No. 306
22.	HCl 30%	2.18	Indigenous	-
23.	CP. HCl	6.30	Indigenous	-
24.	Hydrogen gas	0.25	Indigenous	Schedule I – Part II No. 314
25.	Hy-flow	0.05	Indigenous	-
26.	Methyl acetoacetate	1.40	Indigenous	-
27.	Methanol	58.47	Indigenous	-
28.	Ortho-di chloro benzene	8.34	Indigenous	-
29.	Pd/C 5%	0.10	Indigenous	-
30.	Beta Phenyl ethyl amine	15.17	Indigenous	-
31.	Potassium hydroxide	0.50	Indigenous	Schedule I – Part II No. 522
32.	Potassium Carbonate	4.90	Indigenous	-
33.	POCl3	11.68	Indigenous	-
34.	Raspberry ketone	2.50	Indigenous	-
35.	Raney Nickel	1.46	Indigenous	Schedule I – Part II No. 420

S. No.	Raw Material	Requirement (TPM)	Source	List as per MSIHC Rules, 2000
36.	Sodium bicarbonate	10.52	Indigenous	-
37.	Sodium carbonate	0.50	Indigenous	-
38.	Sodium hydroxide	2.11	Indigenous	Schedule I – Part II No. 571
39.	Sodium methoxide	0.61	Indigenous	-
40.	Thiophenol	0.01	Indigenous	Schedule I – Part II No. 621
41.	Toluene	156.63	Indigenous	Schedule I – Part II No. 628
42.	Triethylphosphono acetate	1.09	Indigenous	-

1.1.3 Water Requirement

The water requirement of the unit will increase from its existing demand of 20 KLD to 64.00 KLD (Fresh water requirement-49 KLD and recycled water-15 KLD). Additional Water requirement for the proposed expansion project will be sourced from existing water supplier KIADB. The break-up of water requirement for each industrial use is shown in the **Table 1.4**.

Table 1.4 – Water Requirement

S. No.	Description	Water Requirement in KLD
1.	Domestic	8.0
2.	Process – (Production , QC, R&D)	12.5
3.	Washing/Cleaning	6.0
4.	Boiler Feed Water	22.0
5.	Wet Scrubber	0.5
6.	Cooling Tower Make up	15.0

1.1.3 Manpower Requirement

The existing man power is 90 persons for the operation phase and additional 50 persons are required for the proposed expansion project.

1.1.4 Power and Fuel Requirement

The total power requirement of the unit will increase from its existing load of 300 KVA to 1000 KVA after the proposed expansion project. The existing and additional power requirement will be sourced from Chamundeshwari Electricity Supply Corporation Ltd. (CHESCOM). As a back-up power supply, one DG sets having capacity of 500 KVA is

available and one DG set of 500 KVA is proposed. Fuel Requirement is shown in Table 1.5. Additionally a Boiler of 3 TPH is proposed for the project.

TABLE 1.5 – FUEL REQUIREMENT

Type of fuel	Source of use	Nos	Capacity	Quantity
Existing				
Briquettes	Agro Boiler	1 No	0.75 T/Hr	7 TPM
Diesel	DG set	1 No	500 kVA	3000 Lit/Month
Proposed				
Briquettes	Agro Boiler	1 No	3 T/Hr	30 TPM
Diesel	DG set	1 No	500 kVA	3000 Lit/Month

2.0 DESCRIPTION OF THE ENVIRONMENT

2.1 Location of the Project

The proposed expansion project site is located at located at Toremavu village, Nanjangud Taluk, Mysore District, Karnataka State. The details of environmental setting are given in **Table - 1.2**. The topographical feature of the study area within 10-km radius is depicted in **Figure -1.1**.

TABLE - 1.2 : ENVIRONMENTAL SETTING

S. No.	Particulars	Details		
1	Latitude & Longitude	12°08'56.82" N	76°41'54.41"E	
2	Elevation above MSL	670 m above mean sea level		
3	Topo sheet No.	57 D/ 12 & 16		
4	Land Use Classification	Industrial Area		
5	Site Topography	Plain		
6	Nearest Highway	NH - 212 (Mysore - Kozhikode)	1.5 km	W
7	Nearest Railway Station	Nanjangud	3.3 km	SW
		Mysore	15.2 km	NW
8	Nearest Airport	Mysore Airport	9 km	NW
9	Nearest Town/ City	Nanjangud	3 km	SW
		Mysore	15 km	NW
10	Nearest Sea Port	Nil in 10 km radius		
11	Archaeologically important places	Nil within 15 km radius		
12	National parks, Wildlife Sanctuaries, Eco-sensitive zones	Nil in 10 km radius		
13	Nearest Water bodies	Kabini River	1.9 km	SE
		HadinaruKere Lake	5.5 km	ENE
		Dadadahalli Tank	8.8 km	NW

S. No.	Particulars	Details
14	Reserved/ Protected Forests	Nil in 10 km radius
15	Seismicity	Zone II as per IS 1893 (Part 1) : 2002
16	Defense Installations	Nil in 10 km radius
17	Nearby Industrial Estates	Nanjangud Industrial Estate

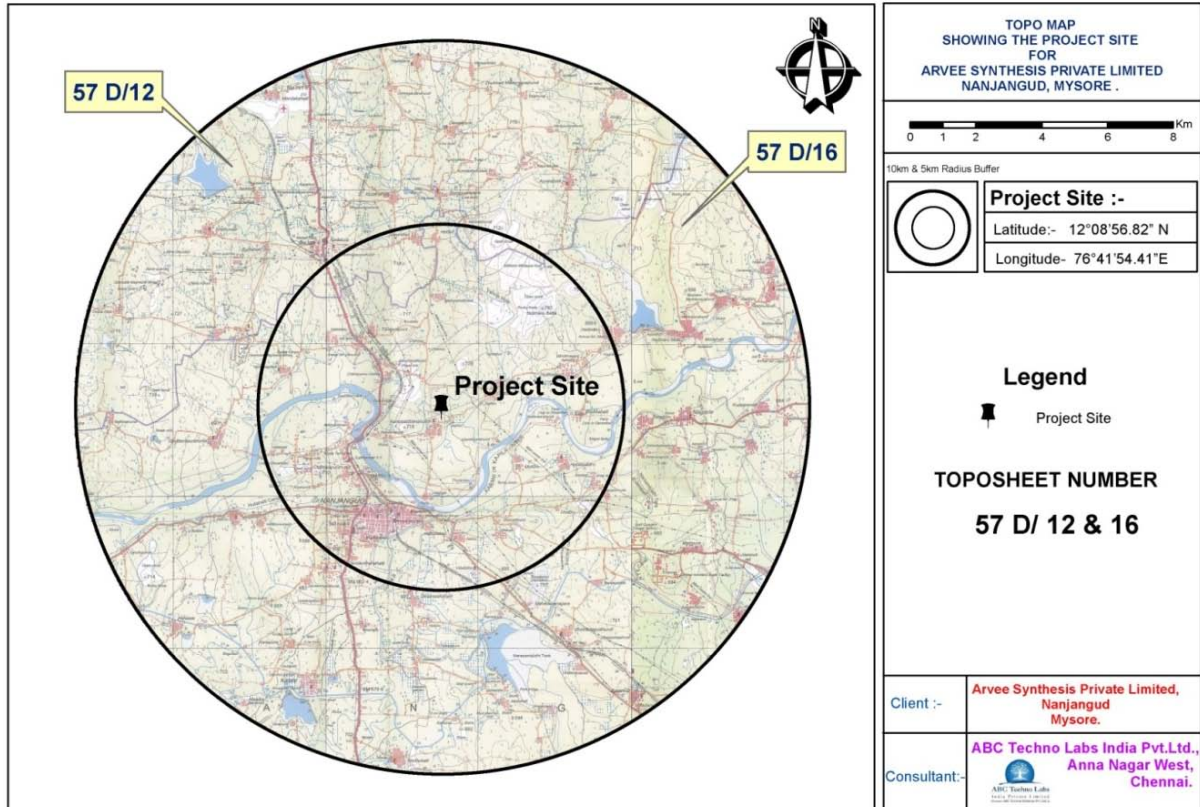


FIGURE - 1.1 : STUDY AREA MAP - 10 KM RADIUS

2.2 Baseline Environmental Monitoring

The baseline environment monitoring consisting of geology, micro-meteorology, ambient air quality, water quality, soil quality and noise levels and field investigations of ecology in the study area generated from March 2015 to May 2015 representing pre monsoon season.

2.3 Meteorology

The predominant wind direction observed during the study period is West South West for 22.5% of the total time and followed by South West for 12.78 % of the total time. The mean maximum and mean minimum temperatures recorded at site during study period were 16°C and 26°C. The Relative Humidity was observed to range from 65.17

– 76.82% during the study period at the site.

2.4 Ambient Air Quality

Ambient Air Quality Monitoring (AAQM) stations were set up at eight locations. The air samples were analyzed as per standard methods specified by Central Pollution Control Board (CPCB), IS: 5184 and American Public Health Association (APHA).

The maximum value for PM₁₀ was observed at Immavu as 69.1 µg/m³ and minimum value was observed at Hejjige as 30.4 µg/m³. The maximum value for PM_{2.5} was observed at Immavu as 33.9-µg/m³ and minimum value for PM_{2.5} was observed at Kembisidhanahundi as 15.6 µg/m³. The maximum value for SO₂ was observed at Immavu as 11.3 µg/m³ and minimum value for SO₂ was observed at Project site as 5.1-µg/m³. The maximum value for NO₂ was observed at Thandavapuram as 24.6 µg/m³ and minimum value for NO₂ was observed at project site as 6.9 µg/m³. The maximum value for NH₃ was observed at Immavu as 5 µg/m³ and minimum value for NH₃ was observed at project site as 6.6 µg/m³. The concentration of CO was observed Below Detection Limit (BDL) of 1 mg/m³ and concentration of VOC was observed Below Detection Limit (BDL) of 0.001 µg/m³. The concentrations of all the pollutants are observed to be well within the standards prescribed by Central Pollution Control Board (CPCB).

2.5 Noise Level Survey

The noise monitoring has been conducted for determination of ambient noise levels at ten locations in the study area. The daytime noise levels in all the rural and residential locations were observed to be in the range of 44.1 to 51.3 dB(A). The night time noise level in all the rural and residential locations was observed to be in the range of 39.5 to 42.8 dB(A). The day and night time noise level at all locations was observed to be within the prescribed limit of 55 dB (A) and 45 dB(A) respectively.

2.6 Water Quality

The water quality monitoring has been conducted at 6 ground water locations and 3 surface water sources covering 10 km radial distance were examined for physico-chemical, heavy metals and bacteriological parameters. The water in general is not fit

for drinking as most of the parameters are above the standards prescribed under IS 10500 drinking water standards.

The analysis of ground water results indicate that the average pH ranges in between 6.11-7.14, TDS ranges from 488 mg/l - 2093 mg/l, Total Hardness ranges from 260 mg/l - 1640 mg/l, Sodium ranges from 43- 190 mg/l, Total Alkalinity ranges from 276-590 mg/l, chloride ranges from 33-861 mg/l and sulphate ranges from 20-616 mg/l, iron content ranges from BDL (<0.05) mg/l - 0.18 mg/l, nitrate content ranges from 1.2 mg/l - 188 mg/l was observed.

The analysis of Surface water results indicate that the average pH ranges in between 7.12-7.17, TDS ranges from 149 mg/l - 358 mg/l, Total Hardness ranges from 106 mg/l - 180 mg/l, DO ranges from 7.1 mg/l - 7.5 mg/l, nitrate content ranges from BDL (<1) mg/l - 2.3 mg/l was observed.

2.7 Soil Characteristics

Various locations within 10 km radius of the project site boundary were selected for soil sampling. It has been observed that the pH of the soil was ranging from 6.63 to 7.19. Texture of the soil sample is predominantly clay and loam. The available nitrogen content ranges between 26.8 to 56.4 mg/kg in the locality. The value of phosphorus content varies between 46.8 to 97.1 mg/kg and the potassium content varies from 195 to 311 mg/kg which indicates that the soils have moderate quantities of potassium.

2.8 Flora and Fauna Studies

Field survey conducted during the study period revealed that total number of 19 species have been recorded of which maximum of 6 species are accounted for trees followed by 6 species of grass. None of the reserve or natural forests falls within the 10 km radius around the project site area. No wild life sanctuaries or national parks or biosphere or hotspots in 10 km radius from the project site area. A total number of 8 species of fauna were identified during the survey under the study area.

2.9 Land Use Studies

To demarcate different land use classes using the remote sensing data such as satellite imagery and application of GIS techniques for assessing the areal extent of the different classes that is interpreted.

2.10 Demography and Socio-Economics

The methodology adopted for the study is primarily based on the review of secondary data, such as District Primary Census Statistical Handbook of Mysore District, 2011 for the parameters of demography, occupational structure of people within the study area of 10-km radius around the project site area. During the operation phase it will generate job opportunities for both skilled and unskilled workers.

3.0 ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The anticipated environmental impacts and mitigation measures are presented in **Table-1.3**.

Table- 1.3: Anticipated Adverse Environmental Impacts & Mitigation Measures

Discipline	Potential Negative Impacts	Probable Source	Mitigative Measures	Remarks
Constructional Impact				
Water Quality	Increase in suspended solids due to soil run-off during precipitation	Loose soil at construction site	During monsoon season runoff from construction site will be routed to a temporary sedimentation tank for settlement of suspended solids.	---
Air Quality	Increase in dust and NO ₂ concentration	Heavy vehicular movement	Sprinkling of water in the construction area and unpaved roads. Proper maintenance of vehicles will be done.	The impact will be low, as the main approach will be tarred for the expansion project
Noise	Increase in noise level	Construction equipment	Equipment will be kept in good condition to keep the noise level within 85-dB (A).	Workers will be provided with necessary protective equipment <i>e.g.</i> Ear Muff & ear plug. Acoustic chamber for DG set
Terrestrial Ecology	Clearing of Vegetation	Soil enabling activities	Landscaping and extensive plantation will be done.	Plantation will be done in consultation with the local forest department. Every

Discipline	Potential Negative Impacts	Probable Source	Mitigative Measures	Remarks
				year on 5 th June the in-house plantation programme shall be taken up and it is an on-going activity. Minimum 100 trees per year in house.
Operational Impact				
Air Quality	Increase in PM, SO ₂ and NO ₂ levels in ambient air.	Stack emissions and raw material storage yards.	High efficiency wet scrubber will be installed to control the emission from reactors. Dust collectors will be used for the Boiler. Adequate stack height will be provided as per CPCB guidelines for the proper dispersion of pollutants. Motor able roads in the plant area will be paved to reduce dust emission. Plantation programs will be undertaken around the plant area.	The resultant air quality will confirm to the stipulated standards as prescribed by CPCB and KSPCB. Particulate emission from the proposed boiler stacks will be maintained below 150 mg/Nm ³ .
Noise	Increase in noise levels in the plant area.	Equipment in main plant and auxiliaries	Equipment will be designed to conform to noise levels prescribed by regulatory agencies. Provision of green belt and plantation would further help in attenuating noise.	Employees working in high noise areas would be provided Ear muff & earplugs as protective device.
Water Quality	Deterioration of surface water quality.	Discharge from domestic usages. Discharge from Process.	Adequate volume of septic tanks and dispersion trench will be provided. Process effluent will be separated into High Polluting stream and Low polluting stream. The low polluting stream will be treated through the ETP. High polluting stream will be treated through the proposed Multiple Effect Evaporator. The treated effluent will be used for cooling tower make-up and green-belt development.	There shall not be any discharge outside the plant premises. Treated effluent will be reused for cooling tower make-up and green - belt development within the project site.

Discipline	Potential Negative Impacts	Probable Source	Mitigative Measures	Remarks
Solid waste	ETP sludge , process residue , Spent catalyst & spent carbon, MEE salts	From Process , ETP , MEE	Hazardous wastes will be disposed to TSDF for incineration / land filling.	Efforts will be made to reutilize the solid waste.
Ecology				
a. Terrestrial	Impact on plant species	Emissions from stack	Emissions will be controlled as well as dispersed through appropriate design.	As ambient air quality will be within limits, no impact on the vegetation is expected.
b. Aquatic	Impact on aquatic life of the water bodies	Treated waste water	The domestic and process wastewater will be provided with adequate treatment facilities	As the sewage water and effluent will be treated scientifically and thus there is no significant impact on aquatic life.
Demography and Socio-economics	Strain on existing amenities like housing, water sources and sanitation, medical and infrastructure facilities.	Influx of people of proposed expansion employees as well as contractor's employees/labourers.	Most the workers requirement will be fulfilled by local people. No significant impact is envisaged	Overall socio-economic status of the area is expected to improve. CSR activities will be done to help the persons in the surrounding village.

4.0 ENVIRONMENTAL MONITORING PROGRAMME

Environmental monitoring will be conducted on regular basis to assess the pollution level in the surrounding area. A comprehensive monitoring program is suggested in **Table - 1.4.**

TABLE - 1.4: MONITORING SCHEDULE FOR ENVIRONMENTAL PARAMETERS

S. No.	Component	Parameter	No of Locations	Frequency/ Duration
Construction Phase				
1	Ambient Air Quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO, VOC	Project site & surrounds	Once in a month
2	Ambient Noise Quality	Leq , L10, L50, L90	Project site	Once in a month
3	Ground water Quality	Parameters specified under IS:10500, 1993	Project site	Once in 3 Months

S. No.	Component	Parameter	No of Locations	Frequency/ Duration
4	Soil Quality	pH, texture, EC, organic matter, NPK, NA, Ca & Mg	Project site	Once in 6 months
Operational Phase				
1	Ambient Air Quality	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , CO	3 locations	Once in a month
2	Fugitive Emission	PM ₁₀ , PM _{2.5} , SO ₂ , NO ₂ , HC, H ₂ S	Unit Emissions	Once in a month
3	Stack Emission Monitoring	PM, SO ₂ , NO ₂ & CO	Process, Boiler & DG Set	Once in a month
4	Source Noise	Leq	Unit Operation	Once in a month
5	Ambient Noise Quality	Leq , L10, L50, L90	Boundaries	Once in a month
6	Ground water Quality	Parameters specified under IS:10500, 1993	Project site	Once in 3 months
7	Soil Quality	pH, texture, EC, organic matter, NPK, NA, Ca & Mg	Green Belt area	Once in a year

5.0 ADDITIONAL STUDIES

The following additional studies/activities have been carried out for the proposed project on different aspects:

- Risk assessment studies have been carried out including preparation of Disaster Management Plan;

6.0 PROJECT BENEFITS

The project will generate employment to local people, The employment of local people in proposed project shall upgrade the prosperity of the region. This will in turn improve the socio-economic conditions of the area. The total manpower required for the proposed expansion project during the operation phase is about 50 persons which would be mainly sourced from local community in and around the plant and few technical persons will be employed from outside area. In addition to the above, direct employment. There will be indirect employment to many more people in the form of contractual jobs and will enhance the economic status.

7.0 EMP - ADMINISTRATIVE ASPECTS

A separate Environment Department with qualified staff along with engineers, technicians, supervisors, helpers, etc is working in project site.

8.0 SUMMARY & CONCLUSION

The proposed expansion project will have certain level of marginal impacts on the local environment. Thus, it can be concluded that with the judicious and proper implementation of the pollution control and mitigation measures, the proposed expansion project will be beneficial to the society, will help reduce the demand supply gap and will contribute to the economic development of the region in particular and state in general. The basic requirement of the community needs will be strengthened by extending health care, educational facilities to the community, providing drinking water to the villages, strengthening of existing roads in the area. Sequent Scientific Limited will initiate the above amenities either by providing fund or by improving the facilities in the area, which will help in uplifting the living standards of local communities.

