EXECUTIVE SUMMARY

1.1 General

Unlike other waste streams, industrial solid wastes are having more left-out residues of resources which can be recovered for reuse and recycle. In most of the situations, the segregation is feasible at source and the recovery is feasible as they are high value chain. However, such Hazardous Waste (HW) streams are complex with varying environmental dimensions like pollution, resource management and climate change. The present strategies of Hazardous waste management are primarily based on pollution control and hence, it requires to be reinvented for resource management and also in the light and purview of climate change initiatives.

Industrial growth is unprecedented in the last few decades in India, especially in the state of Karnataka; it is rapid and continuing in the last one decade. Eventually, the waste generation from several industries has multiplied several folds to become a serious environmental threat. Most of the wastes from industrial activities are toxic and hazardous in nature. In India, required scientific systems and facilities to handle and manage such industrial hazardous waste have not yet established sufficiently and it was stressed in many Environmental Forums.

Hazardous Waste Management Rules have been enacted by **Ministry of Environment, Forests & Climate Change** (MoEF&CC) since **1989** and after several amendments; it has taken stringent status of implementation in this country from **Hazardous Waste (Management, Handling & Trans Boundary) Rules** enacted in **2008**. Perhaps, the Environmental Impact Assessment Notification, 2006 brought the Hazardous Waste management activities under its purview as **Treatment, Storage and Disposal Facility for Hazardous Wastes (TSDF)** and mandated Environmental Clearance as a classified project activity under project activity **7 (d)** under category **A**. Since then, Central Pollution Control Board have published several guidelines for TSDF establishments and specifically on methodologies for recycling of hazardous wastes so that environmental foot print of TSDF can be reduced.

Karnataka, especially Urban-Connects from Bangalore has become a hub for industrial growth and the proposed project location, Tumkur which is by 75 Km from Bangalore is experiencing a phenomenal industrial growth in the recent past.

The proposed Integrated Hazardous waste management facility which is technically a TSDF, is envisaged as **Resource Recovery Facility (RRF)** and will be located in one of the largest Industrial Area developed by **Karnataka Industrial Area Development Board (KIADB) near Vasanthanarasapura, Tumkur**. The location of this notified Industrial area has more than 4000 acres of land under industrial development with more than 100 industries in operation and another 100 more industries of varied types like Pharmaceuticals, Paint, Automobile, Adhesives, Chemical, Metal, Wood, Paper, etc, are in pipe line under various stages of establishment.

The present proposal is an **Integrated Hazardous Waste Management Facility** (IHWMF) for **20 TPD of HW** processing capacity will be incorporated with Engineered Plants and Machineries like **Disintegrator, Mixer, Neutralization Reactors and Rotary Kiln Incinerator**. The facility is envisaged for **Resource reclamation** from the waste streams as materials for recycling, fuel-mix proportioning towards a feed for co-processing in Cement/Power/Steel Mills and ultimate disposal of final residues in Rotary Kiln Incinerator**.** The Plant Components ahead of Rotary Kiln Incinerator are thus will enable the proposed IHWMF to reclaim **Alternate Fuel and Raw Materials** (AFR) as per the Guidelines of Central Pollution Control Board (CPCB).

1.2 PROJECT LOCATION

Century Eco solutions India Private Limited (CESPL) is a newly floated sister concern of **Century Drums & Barrels Industries. CESPL** is now proposing this **INTEGRATED HAZARDOUS WASTE MANAGEMENT FACILITY** (IHWMF) with **Alternate Fuel and Raw Materials** (AFR) recovery plant to produce fuel mix from the segregated hazardous waste stream which can be used as alternate fuel in co processing and also **Rotary Kiln Incinerator** for ultimate disposal of non recyclable residue of the segregated waste streams.

The proposed facility is envisaged for establishment **in** the **1.75 acre of vacant land** in their industrial plot No. **161-B&C, KIADB Industrial Area, Vasanthanarasapura, Tumkur, Karnataka.**

The location of the proposed TSDF as IHWMF, as a Key Plan is presented in **Fig.1**

1.3 PROJECT- INTEGRATED HAZARDOUS WASTE MANAGEMENT FACILITY (IHWMF)

Hazardous Wastes (HW) by virtue of its sources of industrial manufacturing or production processes have significant calorific and mineral values. Hence, recovery of resources should be done prior to ultimate disposal of residues. CESPL is in line to the principle of recovery of Material and Energy values, proposed this TSDF.

Fig.1

The proposed CESPL Facility is planned for a processing capacity of **20MT per day of Hazardous waste** from industries like **Paint, Paper, Alumina sludge, spent organic chemicals, Automobile, Pharmaceuticals, wood**, etc,. The facility will primarily address the requirement of industries in the KIADB Industrial Estate and also some potential small and medium category industries in the project location.

The proposed facility of CESPL will be first of its kind to have fuel-mix proportioning plant, prior to Incineration so that it ensures complete reclamation of materials, fuel-mix preparation for co-processing and Incinerator for residue management. This proposal is a permitted activity under **EIA Notification, 2006** as project activity 7(d) - **A Category** that requires **ENVIRONMENTAL CLEARANCE** under the defined project classification of TSDF.

The product from Waste Proportioning for Fuel Mix or reclamation of material which can be sent for recycling will be around 10T per day and another 10T per day will be incinerated in the Rotary Kiln Incinerator. Hence, the proposed IHWMF will provide AFR, as mandated by CPCB and will reduce the requirements for Incineration which leads to have the principle of Reduce, Reuse/Recycle ahead of ultimate disposal in Incinerator. The AFR will draw calorific value from the organic part of the waste and material from the mineral part of the waste and thus all reusable/recyclable part of hazardous waste reaching the proposed facility will be meant for co processing. This will make the proposed CESPL facility as environmentally compatible and financially feasible.

The proposed **Integrated Hazardous Waste Management Facility (IHWMF)** with **Material Recovery systems** and **Fuel-Mix Proportionate reactors** for reclamation of **AFR** and **Rotary Kiln Incinerator** to dispose the rejects and non-recoverable trash will cater the requirements of industries to manage their hazardous waste in compliance to Hazardous Waste Management Rules of MoEF&CC. The facility will address the CPCB defined- hierarchy requirements in hazardous Waste management with plant components for Reuse and Recycle ahead of ultimate disposal in Incinerator.

CESPL will adhere to the Guidelines for Storage of incinerable Hazardous Wastes by the operators of Common Hazardous Waste Treatment, Storage and Disposal Facilities (TSDF) and captive HW Incinerators, CPCB, 2008 for the proposed IHWMF as TSDF.

An Inventorization study on Industrial waste was made by CESPL in the project location, during December, 2015 and it was assessed with the support of data from Karnataka State Pollution

Control Board (KSPCB) that the present level of Hazardous Waste generation in Tumkur District is 50-60Tonnes per day and most of them is currently under captive storage in huge quantity in the respective industries. The types of wastes largely incinerable which includes Paint Sludge, Oily Filter Cake, Spent Carbon, Organic waste, Tarry waste, Biomass, ETP Sludge, etc., and also non-incinerable resin, Distillation Residues, ETP sludge, and alumina sludge. There is a significant quantity of waste that falls under the category of synthetic rubber, plastics, etc., which are characteristically high calorific value, which are recommended for use in co-processing cement industries by CPCB.

The surveyed types of waste as generated in the project location can be strategically segregated, neutralized, mixed- proportionately to use it **Alternate Fuel and Raw Materials** (AFR), as defined by CPCB. The industries that were surveyed are keeping their waste in temporary storage with Authorization from KSPCB to do as, in compliance to HW (M,H & TB) Rules, 2008.

The situation is unique that the generation level of waste in several industries is not enough to transfer directly for co processing in Cement Industries. Hence, there is a requirement for intermediary collection and transfer, after proportioning and enrichment of calorific value by proportionate mixing. This will enable the entire waste transfer and management strategy as technically feasible to reclamation and reuse/recycle. The proposed IHWMF of CESPL at Tumkur in the KIADB approved Industrial area will address this issue and ensure resource optimization, energy from waste and ultimate disposal to ensure environmentally sustainable development of industries in Tumkur District, Karnataka.

The scope and need for establishing Incineration facilities within the major Industrial Estates are highly feasible and demanding as transfer of waste to distance locations of common facilities will increase further the environmental foot print of the Solidwaste.

It is important that any Industrial Estates (or Parks) of housing Industries that are generating significant amount of Solidwaste shall be having facilities to manage in the location itself. In such Management Strategies, only Land fill requirements can be addressed to Common facilities, even if they are at distance as area requirement and land use pattern will disfavor the landfill facilities within the Estates (or Parks). However, incinerable wastes which are characteristically organic and volatile can be managed by establishing Incinerators integrated with emission cleaning systems within the Estates to provide better management practice for Incinerable Hazardous Waste from the respective Estates.

The ash and residual sludge from effluent treatment can be, however, sent to Common, Centralized Landfill facilities. The proposed Hazardous Waste Integrated facility will be first of its kind as it will drastically reduce the Environmental Foot Print as *the recoverable part of waste will be reclaimed as Resource for Reuse as AFM*- which is principally intended for use as alternate Fuel/Material in co processing requirements in Thermal plants and cement industries.

1.4 PROJECT METHODOLOGY

The recoverable energy and mineral values of HW is the principle of the proposed TSF with AFR and Rotary Kiln Incinerator. The final incineration ash and inerts will be disposed through Hazardous Waste Landfill facility near Mysore.

The Methodology is planned technically on the basis of Guidelines for Environmentally sound Recycling of Hazardous Wastes, by CPCB in 2010. The Guidelines of CPCB for AFR to co processing in Cement Industry have been used to format the operation methodology of the proposed TSDF.

The Integrated Hazardous waste Management Facility will have Resource Recovery Plant to recover materials like plastics, metals, glass, etc., and Fuel-Mix plant to proportionately mix select-waste streams to have a qualified feed for Co-processing in industries like Cement, Steel and Power Plants as per the Guidelines of Central pollution Control Board (CPCB).

The reclamation of AFR ahead of Rotary Kiln Incinerator is the unique feature of the proposed IHWMF. CESPL will get state of the art and the best available technologies to install the facility as Waste to Resource Recovery facility.

The IHWMF will be installed with required systems for waste segregation, neutralization, proportionate mixing & incineration for the final residue of waste and rejects from AFR.

The Plant will be installed with PLC based auto operating supports and continuous monitoring and data maintenance systems. The treated effluent will be fully recycled and reused for Emission quenching, wet cleaning , ash wetting, green belt development, etc., The final ash from Incinerator will be disposed through approved Hazardous Waste Landfill facility (off site, near Mysore).

The proposed project is essentially a Hazardous Waste Management Facility which will have Plant components to reclaim AFR from the hazardous waste streams.

The rest which is highly heterogeneous and segregation is challenge, will be disposed through Rotary Kiln Incinerator.

The AFR reclamation facility is envisaged for a processing capacity of **10 MT per day** with Segregation yard, Disintegrator, Neutralizing Reactor, Dry and wet mechanical Mixers for proportionate mixing and value addition for Calorific value and or mineral value.

The reject materials from AFR facility and other waste which have materials in a non recoverable state will be done to ash in Rotary Kiln Incinerator. The Incinerator facility is designed to process **10MT of incinerable waste per day**. The Incinerator will have plant components and systems as per the recommendations of CPCB for Hazardous Waste Incineration Facility.

The Incinerator will be integrated with Cyclone for dry particles separation and Venturi Scrubber for wet cleaning of emission for acid and metal oxides. It also incorporated with an Effluent Treatment Plant for neutralization of the spent liquor from the scrubber.

As a whole, the proposed IHWMF can handle and process **20 MT per day of hazardous waste.**

The 25 MT of waste can be transported in a maximum of **2-3 numbers of conventional lorry vehicles** and it can also be transported in **one special vehicle like Taurus**.

The Budgetary Estimate of the project is INR **10 Crores**.

The proposed IHWMF will have two major plant components viz., AFR Reclamation facility (10 TPD) and Rotary Kiln Incinerator (10 TPD).

The AFR reclamation facility is envisaged for a processing capacity of **10 MT per day** with Segregation yard, Disintegrator, Neutralizing Reactor, Dry and wet mechanical Mixers for proportionate mixing and value addition for Calorific value and or mineral value.

The reject materials from AFR facility and other waste which have materials in a non recoverable state will be done to ash in Rotary Kiln Incinerator. The Incinerator facility is designed to process **10MT of incinerable waste per day**. The Incinerator will have plant components and systems as per the recommendations of CPCB for Hazardous Waste Incineration Facility.

The Budgetary Estimate of the project is INR **10 Crores**.

NEED FOR THE PROJECT

The KIADB Industrial area at Vasanthanarasapura is the biggest Industrial area with more than 4000 acres under development. There is another 5 such notified Industrial areas under the aegis of KIADB in Tumkur District.

The increased industrial activities around the project location and type of industrial waste streams as they have been surveyed for project survey indicated and concluded for a Waste Management Facility.

The list of major industries with respect to envisaged waste feed streams is presented in **ANNEXURE-I.**

The classified waste streams from the probable client industries are listed in **ANNEXURE-II.**

KSPCB already inventoried the waste streams and stated in many forums on the need for such a proposed IHWMF in the project location.

A Key Plan showing the location of the proposed IHWMF with respect to notified Industrial area for 10Km radius is presented in **ANNEXURE-III**.

The proposed project will bring a new business model as RRF as it is envisaged to produce AFR at 10TPD which can be co processed in the adjoin industries.

A Key Map showing major Cement, Steel and Power Plants in the project location where CESPL is intended send AFR for co processing the qualified feed, which will otherwise remain or managed as waste.

DEMAND – SUPPLY

As could be observed in **Annexure-I,II and III**, there is a huge demand for Hazardous Waste Management facility and there is scope to supply qualified- value added fuel mix as AFR that can be supplied to industries for co processing.

CESPL will be able to convert the waste into valuable materials, reclaim a fuel-mix and ultimately enable the client-industries to comply with HW (M,H&TB)Rules, 2008.

The proposed CESPL facility for managing Hazardous Waste for recovery of resources from the waste streams will be a trend setter, especially, to demonstrate how an integrated facility will be able to generate resources from the waste, thus IHWMF will be environmentally compatible and financially feasible project.

The project will improve the life cycle resources in the HW streams thus will enhance material optimization and will go in compliance to the CPCB's mandate for Reuse/Recycle and do the least in Incineration to ensure safe disposal of Hazardous waste from industries.

IMPORTS VS INDIGENOUS PRODUCTION

The indigenous production of AFR, that too from HW streams is a non conventional resource management practice. This AFR will be used for co processing in the nearby Cement industries in Karnataka.

The mineral and calorific rich- AFR will definitely offset the requirement of fuel which otherwise, in normal circumstance is being imported. However, the size of the proposed facility is tiny and that it will unlikely to have any impact on Imports.

Nevertheless, similar efforts to reclaim the material resources from HW at national scenario as AFR will certainly have a positive impact on imports significantly in the secondary oil requirements and coal products.

EXPORT POSSIBILITY

The proposed Integrated Hazardous Waste Management facility is essentially a service Industry for waste Management. Hence, despite recovery of AFR from the waste processing, the scope for export does not arise.

DOMESTIC / EXPORT MARKETS

Despite the facility is primarily a waste management, the recovered AFR can be sold domestically for industrial applications like in co processing in Cement, Steel and Thermal Plants

However, there is no export marketing involved in the activities of the proposed facility.

EMPLOYMENT GENERATION

CESPL will have employment generation for about 20 numbers of skilled workers for waste handling and 10 trained work forces for plant operation and maintenance.

1.5 IHWMF- PROCESSES & UNIT OPERATIONS

The proposed project is an Integrated Hazardous Waste Management Facility (IHWMF) with two major facility components viz., **Alternate Fuel and Raw Material (AFR) Reclamation Plant**

and **Rotary Kiln Incinerator,** with HW processing capacity of **20 TPD**. This project is a classified activity by EIA Notification, 2006 as TSDF and as A Category Activity.

A Conceptual facility lay out of the proposed IHWMF is presented in **Fig.2**.

The Integrated Hazardous waste Management Facility will have Resource Recovery Plant to recover materials like plastics, metals, glass, etc., and Fuel-Mix plant to proportionately mix select-waste streams to have a qualified feed for Co-processing in industries like Cement, Steel and Power Plants as per the Guidelines of Central pollution Control Board (CPCB). This plant component is envisaged as Alternate Fuel and Raw Material (AFR) reclamation plant, as recommended by the Guidelines for Co Processing of HW in industrial applications.

CESPL will address the recommendations of National Council for Cement and Building Materials in devising the AFR for Co Processing of AFR in Indian Cement Industry.

AFR Plant

The energy (heat) and mineral values of the different waste will be analyzed to fix the proportionate mixing of the wastes as per the recommendations in the CPCB guidelines viz.,

- ✓ Guidelines for Environmentally sound Recycling of Hazardous Wastes, CPCB, 2010
- ✓ CPCB report on Co Incineration of Hazardous Waste in Cement Kilns in Central Zone By CPCB, Bhopal in 2010-11

The reclamation of AFR ahead of Rotary Kiln Incinerator is the unique feature of the proposed IHWMF. CESPL will get state of the art and the best available technologies to install the AFR Plant as Waste to Resource Recovery facility. This plant will have a well established in-house laboratory to analyze waste streams for their Physical, Chemical and Biological Characteristics.

A rigorous analysis of waste streams for the protocols of Proximate and Ultimate Analysis are the pre requisite to design application-specific AFR for the required mineral and minimum supporting heat value to compliment the intended co processing.

The AFR Plant will be installed with required systems for waste segregation, neutralization, proportionate mixing and value addition sections to enhance the mineral value and calorific value to qualify as feed for co processing along with other raw materials in the manufacturing of Cement, Steel, etc,.

Fig.2

A **Schematic of AFR Plant** is presented in **Fig.3**

Waste segregation

This is a manually operated for quality check protocols for calorific value, organics and minerals. The Organic rich materials will be transferred to incinerator. The Calorific value rich for a minimum of 2500 Kcal/Kg will be segregated to formulate AFR. The mineral rich waste streams will be put into rigorous waste analysis to segregate and proportionately mixed to application- specific AFR.

Disintegrator

There will be two types of Disintegrator installed in the AFR plant. One will be used to crush the materials in to unrecognizable shapes with a Counter-Current screw as **Jaw Crusher**.

Another will be a type of **Ball Mill** which will mill the required materials into required sieve size as powder to add into fuel mix so that proportionate mixing and value addition of the waste mixing as AFR will be achieved.

Neutralization

Semi-solid and Liquid waste streams of HW needs to be neutralized either by proportionate mix of different waste streams or by addition of alkali or acid. This is important to control the chemical reactions between various components of the different waste streams.

Mixers

There will be another mixer to have wet mixing of certain liquid waste with select solids so that the mix gets required calorific value to enrich the value of AFR for co processing.

The Plant will be installed with PLC based auto operating supports and continuous monitoring and data maintenance systems. The treated effluent will be fully recycled and reused for Emission quenching, wet cleaning , ash wetting, green belt development, etc.,

The final ash from Incinerator will be disposed through approved Secured Land Fill Facility.

Rotary Kiln Incinerator

The Rotary Kiln will be designed, installed, operated and maintained as per the CPCB Guidance Document on Hazardous Waste Incinerator.

Fig.3

CESPL is proposing the RK Incinerator for waste processing capacity of 500 Kg/hr (10 TPD). The Incinerator will have Waste Proportionate Mixer for preparing a qualified Feed Stream for optimized operating conditions of the Incinerator and towards achieving Incineration efficiency at 99.99%.

The final rejects of AFR plant will also fed into the RK Incinerator.

A Schematic of the proposed Rotary Kiln Incinerator Plant with APC measures is presented in **Fig.4**

The elemental combustion at 900-950^{0}C will ensure relatively pure emission as the Secondary Chamber at 1100-1200^{o}C will render the emission with only CO_2 in it. However, the residual concentrations of ash and NOx will be removed in a two stage Emission Cleaning systems viz., Cyclone and Wet Scrubber.

The Scrubber liquor will be replaced at 10-20% by fresh alkali solution and the spent liquor will be treated in the ETP.

The ash will be solidified with Cement/Lime before it will be added as constituent of AFR.

The RK Incinerator will have 35m height stack with systems to ensure negative draft in the Kiln so that it performs to control all type of emissions as mandated by MoEF&CC.

PROJECT SIZE AND TYPE

The proposed project is an Integrated Hazardous Waste Management Facility (IHWMF) with two major facility components viz., **Alternate Fuel and Raw Material (AFR) Reclamation Plant** and **Rotary Kiln Incinerator,** with HW processing capacity of **20 TPD**.

The AFR is envisaged to handle and process 15 TPD of HW and RK Incinerator will process 10TPD of waste.

The AFR plant is a Resource Recovery Plant and RK Incinerator is the ultimate disposal of incinerable residues of the collected HW in to the proposed IHWMF of CESPL.

The project location is in a Notified Industrial Area of KIDAB of Government of Karnataka in Tumkur District. The location Map for 10km radius of Impact Area of the proposed project is presented in **Fig.5**

The project Site is largely a plain terrain in its topographical characteristics. However, the surrounding area is characteristically with much of undulations.

Fig.4

Fig.5

The location is barren land **without any water courses, river or lake**. The lack of dependable water courses, naturally, keeps the area away from intensive agricultural activities, despite a small patch of reserved forest nearby, Satellite Imagery as shown in the **Fig.6**

ALTERATIVE SITES

CESPL evaluated three sites for the proposed IHWMF as TSDF. CESPL is managed to exclusively allocate the required land from the already purchased land from KIADB for this project. Since, the location is within the boundary limits of a developed Notified Industrial area and hence only the proposed site was selected by CESPL for the proposed TSDF.

This area fall within the boundary limits if the Notified Industrial area of KIADB.

MATERIAL BALANCE

Being a waste Management Facility, Material Balance of HW Vs Product (AFR) is not scoped. However, for every 10 Tonne of HW, about 7-9 Tonne will be the AFR and for every 10 T of feed into Incinerator 0.01 T will be the final residue of ash.

Project specific material balance is elusive in the absence of the information on the characteristics of HW that are indended for management in the proposed IHWMF.

RESOURCE OPTIMIZATION

AFR is the heart of the proposed IHWMF which will only be supported to ensure complete and comprehensive disposal of HW from the Client-Industries.

AFR facility (Waste to Resources), where all mineral resources like Plastics, Glass, Paper, Boards, Ferrous & Non Ferrous metals, etc,. The resources which cannot be reused will be processed to become AFR with specified Physical, Chemical and Biological Characteristics. The Organic fraction of the waste stream will be segregated based on the calorific value to impart required heating value so that the final product of AFR will be preferred technically and as well economically for co processing.

The energy value of the residual organic waste will be mixed proportionately to become a qualified feed in the Rotary Kiln Incinerator which eventually will ensure ultimate disposal with minimum impacts.

The impact mitigation will be dealt with suitable feeding mechanisms, APC measures and Monitoring systems.

Fig.6

WATER

It is assessed that **3 KLD** will be the requirement for scrubbing. **1 KL**D will be the requirement for green belt development of the project area and around **2 KLD** will be the requirement domestic uses of the workers.

Hence, the total requirement of water requirement for the facility is assessed for **6 KLD** and however, except 2 KLD required for domestic purposes, the remaining 4 KLD can be water reclaimed from treating the effluent in recycle/reuse loop.

The water balance diagram is presented in **Fig.7**

WATER MANAGEMENT

The water requirement for the project is very meager at 6 KLD and it will be supplied by KIADB. CESPL is committed to install water reclamation facility to Effluent Treatment Plant (5 KLD) and thus around 3.5 KLD (70 % of 5 KLD) will be reclaimed after treatment and will be reused in the facility operations like cleaning of emission, floors, vessels, etc,.

Drinking Water of 2KLD will be purified to adhere **BIS 10500** by a package RO plant.

An exclusive Recycle loop for reuse of treated effluent will be in place. CESPL will draw a maximum of 5 KLD only, as 1 KLD requirement for green belt will be met with recycled water.

1.6 WASTE TREATMENT & DISPOSAL

The proposed CESPL facility itself is a Waste Management facility for managing 20 Tonnes of Hazardous Waste.

The design and operation of the facility is envisaged with ZLDP and that the proposed IHWMF will not dispose any liquid or solid waste stream.

The Conceptual Layout of ETP is presented in **Fig.8**

The emission from the Incinerator will be subjected to a Two Tier Emission Cleaning Systems viz., Dry (Cyclone) and Wet (Scrubber) for the pollutant free emission from the stack of the Incinerator.

SEWERAGE SYSTEM

CESPL will lay storm water drainage as open concrete channels, all along the internal roads for ensuring proper collection of storm water and the same be used for charging the rain water harvesting structures.

Fig.7.

Fig.8.

CESPL will have exclusive sewers to collect sewage from worker's conveniences and rest rooms and the same will be treated in Septic Tank and disposed through a Cesspool.

Effluent Treatment Plant

The Effluent Treatment Plant is envisaged as a **Physico Chemical Treatment Plant** with a two-stage, **Pressure Filter System,** in series.

The combined effluent is assessed to have COD at 1200-900 mg/l and BOD of 450- 350 mg/l only. The pH is 6.0 – 8.5. The effluent may have the oil and grease at 40-30 mg/l.

The effluent will be processed in a mechanical system of **Oil and Grease trap,** with three compartment tank. The oil, on floatation, can be removed manually.

The oil removed effluent is envisaged for dosage with an ***alkali solution*** and ***polyelectrolyte*** for **neutralization** and **particle agglomeration**. The chemically treated effluent will then be processed through a mechanical system of **Plate Settlers** for the removal of solids.

The sludge (Settled solids) will be transferred to **Sludge Drying Beds.**

The clarified effluent will then be passed through a Twin filter plant having **Pressure Sand Filter** and **Activated Carbon Filter**. The residual *solids*, *color* and *Refractories* will be removed in these pressure filter systems.

Thus, the proposed effluent treatment plant will perform as **Zero Liquid Discharge Plant**. There will not be any disposal and the entire treated effluent, as reclaimed as water from the MF cartridge package, will be recycled for process use.

The water is thus reclaimed from the effluent and envisaged for reuse in the chemical preparation (Make-up) for wet scrubber (1 KLD) and used for floor, vessel and vehicle cleanings. The requirement of green belt development will be met by recycle water.

SOLID WASTE

The proposed IHWMF of CESPL is itself a Solid waste Management facility as RRP. The reclamation of AFR as recovery from HW for reuse is the unique feature of the proposed IHWMF as TSDF.

1.7 PROJECT FEASIBILITY

The proposed facility will be a common and service industry to ensure HW disposal from the industries in and around 150Km of Tumkur.

The AFR will enable to reclaim all recoverable resources from the collected HW which will get significant revenue, apart from increasing the life cycle of materials and reuse possibilities of such materials in other avenues. This AFR will be sent to Cement Industries for Co Processing which will reduce the environmental Foot Print of CESPL, apart from revenue.

The recovery of saleable AFR will make this IHWMF as environmentally better way of managing HW. This will bring feasibility to operate and maintain in adherence to HW (M&H and TB) Rules, 2008.

It must be noted that there is no such facility, as such, in Tumkur. Hence, the proposed Hazardous Waste Management facility by CESPL is need based and will enable the proposed IHWMF to meet the statuary requirement of **Hazardous Waste Management Rules of MoEF&CC, 2008 and all amendments thereof**.

1.8 SITE ANALYSIS

CONNECTIVITY

The Proposed site is well connected by roads and Railways. The site is located in Tumkur. The site is about 75 Km from Bangalore.

- Nearest Railway Station: 18 Kms, Tumkur

The connectivity of the sites with all required facilities is the major advantage for the present site for the proposed Hazardous Waste Management Facility located within the notified Industrial Area of KIADB.

The project site has been already notified by Government of Karnataka to KIADB to establish Industrial Area and the Vasanthanarasapura is under rapid industrial development.

There is **a small stretch of notified forest in the project location** and as well in the impact area of 5 km radius from the project location.

No notified river or water body is available in the first 1 km radius from the project area.

1.9 POWER

The net power which is envisaged as requirement for operating the proposed IHWMF is estimate for 100 HP. This power will be made available from State EB through its exclusive grid and distribution lines.

KIADB will ensure the power lines to establish this common facility.

1.10 GREEN BELT DEVELOPMENT

CESPL will provide greenery with suitable trees and plantation along the sides of the inner plant roads and in all open spaces.

CESPL will ensure atleast 33% of the area will be covered under green belt development.

1.11 REHABILITATION AND RESETTLEMENT (R & R) PLAN

The proposed location does not require any evacuation. The location is an approved industrial plot in a Notified Industrial Area of KIADB

Hence, there is no requirement for any exclusive RR plan. No land is under agricultural activities.

During EIA studies, a detailed Socio Economic survey in the project impact area will be carried out.

1.12 PROJECT SCHEDULE & COST ESTIMATES

The time schedule of project execution, of land development and getting the CESPL facility to be commissioned, is proposed for Eight months.

The budgetary estimate of the project is assessed for **Rs.10 Crores**.

1.13 CORPORATE RESPONSIBILITY PLAN

CESPL will develop an exclusive Corporate Responsibility Plan to ensure proper environmental management with monitoring programs for the listed pollutant concentrations in air, water, soil and noise, in the ambient environment of the assessed project impact area of 10Km radius of the location. Special Programs and Implementation systems will be stressed for Occupational Health and Safety.

CESPL will keep an exclusive Environmental cell for implementing the envisaged EMP and all set of recommendation and condition of Environmental Clearance from MoEF & CC.

The Schematic of functional setting of Environmental Cell of CESPL is presented in **Fig.9**

Common Initiatives like Off - Site and On-site Emergency Management Plans will be in place with the support of KIADB and Community groups of the surrounding areas for 10Km radius.

Fig.9

CESPL will have special programs and financial provisions to support the community development and social festivals around the project location.

The environmental monitoring will be jointly carried out by CESPL as per MoEF&CC /CPCB Guidelines and State PCB guidelines.

A detailed, Comprehensive Plan of Social and Environmental Responsibility will be framed on completing the EIA studies and documentation.

ANNEXURE-I

LIST OF MAJOR INDUSTRIES*

1. TMEIC
2. AS REFINERIES
3. INDIA FOOD PARK
4. KAILASH ROOFING OF STRUCTURES
5. LAKSHMI WASTE OIL REFINERIES
6. TATA MARCOPOLO, PHARWAD
7. TATA MOTORS LTD, PHARWAD
8. L&T LIMITED
9. LM GLASS FIBER, DABASPET
10. ESSILOR GLASS LENS MANUFACTURING LTD.,
11. RESONANLE LABORATORIES (P) LTD.,
12. SE BLADES, MANGALORE

(*List is only indicative)

ANNEXURE-II

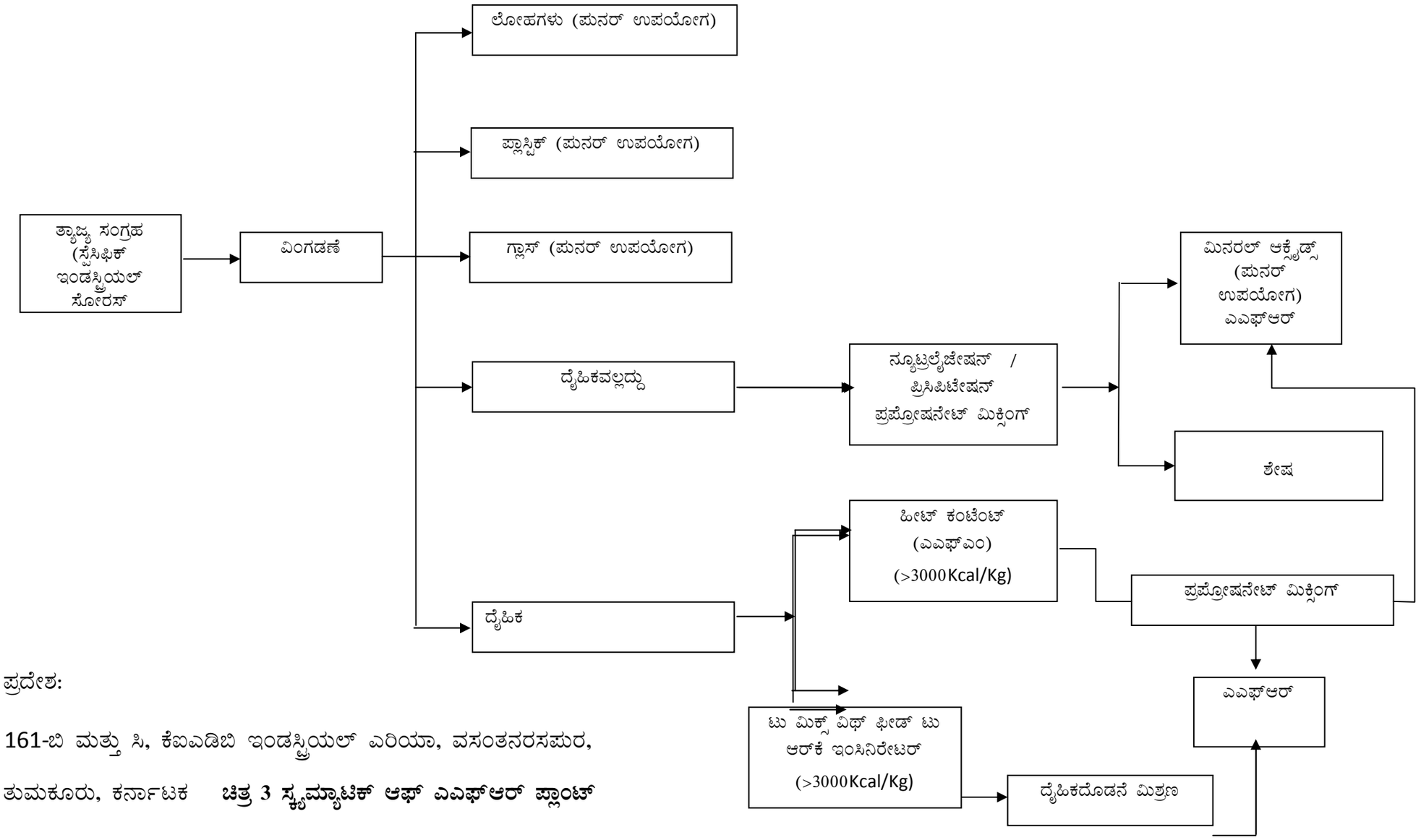
WASTE STREAMS FROM THE SERVICE INDUSTRIES

Name of HW as in CAR	Test Result						Availability tonnage/ annum
	pH	LoD % (w/w)	LoI % (w/w)	CV	Water Solubles		
					Organics	Inorganics	
MEK waste	3.87	1.29	**99.90**	**7780**	0.14	0.81	
Ink Sludge	7.80	34.60	**52.04**	**3731**	0.99	1.20	500.00
Filter cloth	7.11	5.79	**66.14**	**5285**	NA	NA	
Wet ETP Sludge	6.92	66.77	**72.98**	**3187**	1.85	1.78	
Waste Seacant Black	5.96	< 1.0	**39.67**	**3411**	< 0.10	< 0.10	
Waste Seacant White	5.86	7.97	**82.29**	**5314**	< 0.10	< 0.10	
Waste Seacant Clear	4.99	5.79	**33.80**	**7195**	< 0.10	< 0.10	
Wet Chemical Sludge	7.60	33.18	**38.85**	**3173**	0.41	0.13	
Fly ash (Carbon Sooth)	2.46	22.10	**71.90**	**2778**	3.59	14.50	
Paint Sludge	6.82	58.73	**79.01**	**5175**	0.57	0.35	
Benzo-Furan	7.28	7.57	**89.12**	**3606**	0.28	1.00	600.00
Poly Urethane Foam	6.12	2.60	**35.00**	**5842**	0.15	0.25	
Grinding Muck	7.12	2.67	**13.76**	**3523**	0.20	< 0.10	1500.00
ETP Sludge	7.56	22.25	**41.72**	**2542**	1.00	1.00	2000.00
ETP Sludge (Dry)	9.33	15.48	**75.09**	**4491**	1.68	0.89	
ETP Sludge (Wet)	6.72	**52.93**	**89.44**	**4909**	0.64	Nil	
Waste Lens Powder	6.93	0.26	**99.97**	**4993**	7.59	Nil	100.00
Packing Material (Port Material)	6.51	0.20	**98.11**	**9610**	**16.43**	Nil	
ETP Sludge (WET)	8.16	**64.48**	**70.18**	**2696**	20.02		
Incinerated ash	**1.83**	3.94	**69.01**	**5764**	6.95	**22.71**	
ETP Sludge	6.45	6.50	**83.80**	**6479**	< 0.10	< 0.10	
Hyflow, Carbon	6.46	**53.90**	**41.80**	**4252**	0.54	0.46	100.00
Paint Sludge	7.62	23.60	**97.80**	**7089**	NA	NA	500.00
Paint Sludge	7.55	1.00	**28.90**	**2867**	0.10	0.10	
Glue	7.68	0.36	**77.84**	**5920**	< 1.0		
FRP residue	7.60	0.21	**66.73**	**4417**	< 1.0		1500.00
Cured Resin	7.51	0.35	**99.56**	**7321**	< 1.0		
Gel coat	6.28	0.16	**77.59**	**8915**	< 1.0		

Grinding Muck	7.20	9.50	18.41	3484	<1.0	
Manomers (Solid One)	7.48	12.90	**53.91**	**2571**	< 1.0	
ETP Sludge	7.44	29.30	**92.10**	**3798**	< 1.0	
Tyveksuit, gloves and Tissue papers	7.94	< 1.0	**98.83**	**4200**	NA	
Used oil residue	7.49	< 1.0	**83.28**	**5235**	< 1.0	
Paint Sludge	7.18	37.71	**66.89**	**5315**	1.62	
Graphite Powder	5.65	< 1.0	**39.00**	**8081**	< 0.5	
Rexolite Powder	5.69	< 0.50	**91.73**	**9891**	< 0.50	
PL -PEM	7.65	< 1.0	**99.28**	**5985**	1.62	
Organic Residue	9.18	< 1.0	**99.63**	**5155**	< 0.10	
Tar Residue	8.02	5.63	**98.90**	**4900**	1.62	
Chrome Sludge	8.17	4.37	**48.84**	**3801**	O & G (32.20)	
Paint Powder	7.71	0.59	**60.85**	**4224**	2.01	
Green coloured sheet(FRP)	7.95	< 0.10	**96.20**	**8523**	< 0.1	
White Coloured sheet(FRP)	7.98	< 0.10	**99.90**	**6997**	< 0.1	
Ink Sludge	8.35	5.86	**29.40**	**3078**	2.03	
Poly Urethene Foam	8.01	2.73	**91.41**	**5970**	NA	
PPA Salt	2.15	0.43	**48.74**	**6154**	14.91	
MEE Sludge	7.68	8.02	**46.55**	**2750**	99.60	
ETP Sludge	7.61	81.07	**37.59**	**5657**	7.95	
Powder Paint	7.69	0.57	**44.01**	**3662**	11.01	
Used Resin	7.50	0.50	**100.00**	**7004**	0.20	
Paint Sludge	7.50	4.54	**78.20**	**4566**	< 1.0	
Lens Powder	8.24	27.74	**100.01**	**4404**	0.27	
Polishing Pads	7.26	33.49	**84.15**	**4010**	0.42	
Oily Clay	7.60	0.47	**53.10**	**5545**	< 0.10	
Powder Coating Residues	7.28	0.67	**64.70**	**4168**	1.90	
Paint Sludge	7.61	30.77	**77.99**	**3926**	0.43	
Expired Chemical (Liquid)	7.02	0.50	**100.00**	**7842**	O & G (11.2)	
Oil Soaked Cotton Waste	7.25	2.76	**92.40**	**4859**	< 0.10	500.00
Cotton Waste contains Glue & Varnish	7.52	2.99	**96.80**	**4352**	< 1.0	

Paint Sludge	7.92	< 0.50	**58.42**	**4835**	4.50	
Adhesive Polyethylene Tape	7.28	< 0.10	**100.00**	**5260**	ND	
Adhesive Polyethylene Tape	7.28	< 0.10	**100.00**	**5260**	< 0.10	
EVA and Tedler waste	7.82	0.29	**97.79**	**4000**	< 1.0	
Powder Coated Paint	8.27	0.46	**53.50**	**3585**	0.48	
ETP Sludge	8.03	50.50	**46.30**	**3738**	1.15	
Spent Clay	7.76	3.28	**36.14**	**3785**	0.37	
Epoxy Powder	8.31	0.37	**40.93**	**2791**	0.24	
ETP Sludge	8.02	7.20	**78.50**	**2588**	2.01	
Flue Gas and other Residue	1.93	9.86	**73.80**	**2514**	32.52	
ETP Sludge	8.75	49.80	**84.00**	**7350**	1.59	
Toner Powder	8.28	0.21	**43.70**	**3961**		
Used PPE	8.01	< 0.10	**99.00**	**4100**	NA	
ETP Sludge	6.09	35.90	**60.40**	**2478**	6.68	
Sludge from ETP	8.39	6.31	**87.20**	**8475**	0.58	
Disprin Powder	5.00	7.16	**50.95**	**3679**	67.46	
Incin. ash	7.52	1.51	**30.70**	**3193**	2.68	
Coolant Sludge	7.74	9.68	**64.34**	**4532**	0.66	
Distillation Residue	9.71	17.95	**57.76**	**4030**	11.18	300.00
Chromium Salt	4.74	33.08	**58.42**	**3484**	67.15	
Paint Sludge	7.17	51.33	**54.83**	**4117**	0.73	
Coolent Sludge	8.50	8.00	**68.60**	**4398**	O & G 31.2	
Salt Bath Sample	7.48	17.88	**29.84**	**2596**	0.54	
Paint Sludge	7.73	7.03	**67.45**	**3229**	O & G 10.54	
Battery Seperator Fibre	2.14	19.70	**40.60**	**3502**	7.57	
Sulphur from desulphurisation operation	7.92	6.64	**78.73**	**3646**	7.50	
ETP Sludge	8.06	28.00	**50.40**	**3966**	1.92	
ETP Sludge	1.78	27.30	**87.10**	**4912**	WSC 18.61 O&G 9.73	
Paint Sludge	7.30	0.23	**32.00**	**3058**	0.10	
Regin Hardner	7.49	0.23	**86.30**	**3789**	< 1.0	
FRP Sheets	7.58	0.15	**62.50**	**4125**	< 1.0	
Used Oil (residue)	NA	0.25	**96.37**	**9340**	< 0.10	

ETP Sludge	8.01	7.57	**59.33**	**4084**	2.03	
Grinding Dust	7.12	2.67	**13.76**	**2487**	0.20	
Paint Residue	7.23	3.79	**77.22**	**3370**	1.29	
Spent Ion Exchange Resin	8.54	< 1.0	**95.00**	**3309**		
Sodium chloride salt and Sodium Sulphate salt	8.07	11.58	**63.60**	**4439**	31.76	
Hyfloc Carbon	2.99	4.34	**44.34**	**6678**	8.05	
Expired drugs	8.62	2.47	**99.23**	**9608**	< 1.0	
Sludge Recovered from effluent of Ploy Vinyl Alcohol	8.24	64.07	**88.80**	**4870**	18.89	
Process waste from polishing process	6.40	54.92	**36.00**	**6314**	1.14	
Solvent residue	4.42	69.95	**99.37**	**5908**	< 1.0	
Spent carbon from propyphenazone	7.98	41.05	**76.89**	**6165**	9.43	
Propyphenazone solid waste	7.06	39.53	**72.31**	**8023**	5.70	
Spent carbon	1.86	6.34	**87.68**	**4025**	7.98	
Carbon Powder	7.40	1.47	**84.34**	**7305**	1.14	

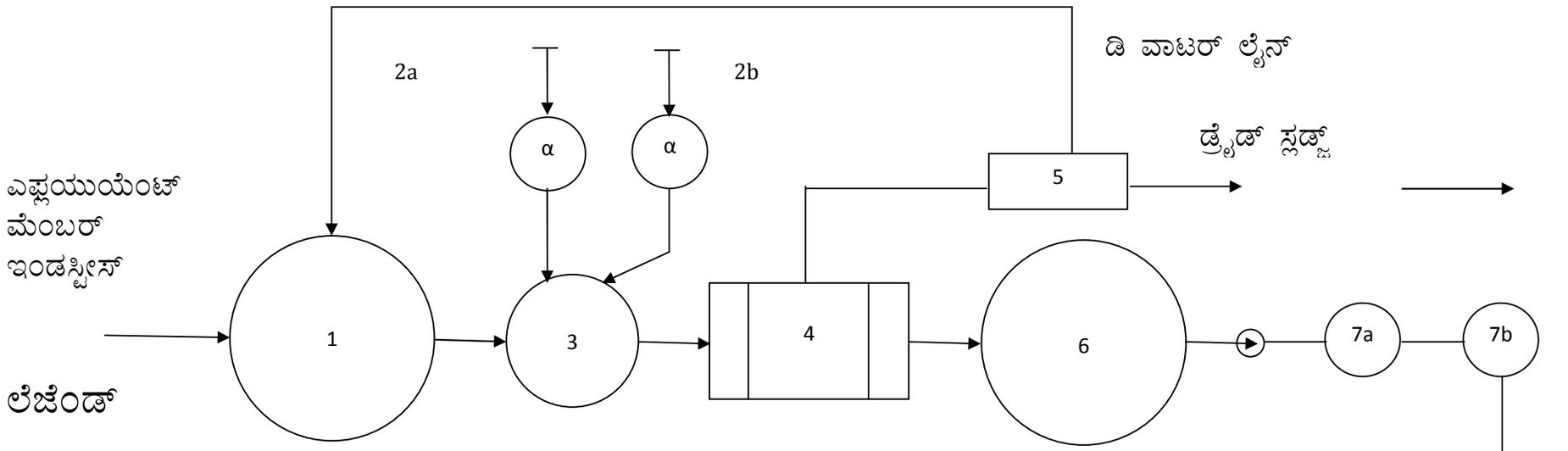


ಪ್ರದೇಶ:

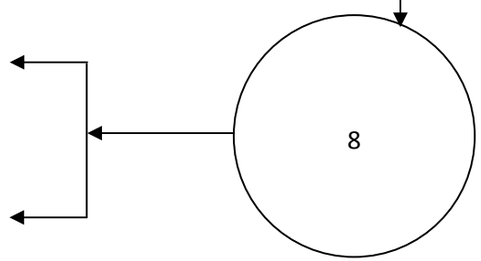
161-ಬಿ ಮತ್ತು ಸಿ, ಕೆಐಎಡಿಬಿ ಇಂಡಸ್ಟ್ರಿಯಲ್ ಎರಿಯಾ, ವಸಂತನರಸಪುರ, ತುಮಕೂರು, ಕರ್ನಾಟಕ

ಚಿತ್ರ 3 ಸ್ಕ್ಯಮ್ಯಾಟಿಕ್ ಆಫ್ ಎಎಫ್ಆರ್ ಪ್ಲಾಂಟ್

ಸಾಮರ್ಥ್ಯ: ಐದು ಸಾವಿರ ಲೀಟರು ದಿನವಹಿ



1. ಈಕ್ವಲೈಸೇಷನ್ ಸಂಪ್
2.ಎ.2ಬಿ. ಕೆಮಿಕಲ್ ಪ್ರಿಪರೇಷನ್ ಟಾಂಕ್ಸ್
3.ಫ್ಲೊಕುಲೇಷನ್ –ಕೆಮೊಕ್ಸಿದಾಷನ್ ರಿಆಕ್ಟರ್
4.ಮೆಕಾನಿಕಲ್ ಕ್ಲಾರಿಫೈಯರ್
5.ಮೆಕಾನಿಕಲ್ ಸ್ಲಡ್ಜ್ ಡಿವಾಟರ್ ಸಿಸ್ಟಮ್
6 ಕ್ಲಾರಿಫೈಡ್ ಎಫ್ಲುಯೆಂಟ್ ಸಂಪ್.
7.ಎ.7ಬಿ. ಪ್ರೆಷರ್ ಫಿಲ್ಟರ್ಸ್ (ಮರಳು ಮತ್ತು ಆಕ್ಟಿವೇಟೆಡ್ ಕಾರ್ಬನ್(
8. ಫಿಲ್ಟರ್ಡ ಎಫ್ಲುಯೆಂಟ್ ಸಂಪ್



ರಿಸೈಕಲ್/ರಿಯೂಸ್

ರಿಯೂಸ್ ಫಾರ್ ಆಷ್

ಸಾಲಿಡಿಫೇಕಷನ್ /ಕೆಂಚಿಂಗ್
ಟವರ್

ಚಿತ್ರ 8 ಕನ್ಸೆಪ್ಚುಯಲ್ ಲೇ ಔಟ್ ಆಫ್ ಎಫ್ಲಯಂಟ್ ಟ್ರೀಟ್ಮೆಂಟ್ ಪ್ಲಾಂಟ್

ಚಿತ್ರ 9 ಪೋಟೋಕಾಲ್ ಆಫ್ ಎನ್ವಿರನ್‌ಮೆಂಟಲ್ ಸೆಲ್

ಐ.ಹೆಚ್ .ಡಬ್ಲ್ಯೂ ಎಂ.ಎಫ್

ಸಿ.ಇ.ಎಸ್.ಪಿ. ಎಲ್.

ಹೆಡ್

ಫೆಸಿಲಿಟಿ ಅಡ್ಮಿನಿಸ್ಟ್ರೇಟರ್ ಅಂಡ್ ಪ್ರಾಜೆಕ್ಟ್ ಮ್ಯಾನೇಜರ್

ಎನ್ವೈರನ್‌ಮೆಂಟಲ್ ಇಂಜಿನಿಯರ್

ಸ್ಟಾಚುಟರಿ ಅಪ್ರೂವಲ್ಸ್ ಫ್ರಮ್ ಕೆ.ಎಸ್.ಪಿ.ಸಿ.ಬಿ./ಎಲ್.ಬಿಸ್./ಇಬಿ./ ಫಾರೆಸ್ಟ್ಸ್/ಸಿ.ಪಿ.ಸಿ.ಬಿ./ಎಂ.ಒ.ಇ.ಎಫ್ ಮತ್ತು ಸಿ.ಸಿ ಎನ್ವೈರನ್‌ಮೆಂಟಲ್ ಸ್ಟಾಂಡರ್ಡ್ಸ್ (ಮಾನಿಟರಿಂಗ್/ ಡಾಕ್ಯುಮೆಂಟೇಷನ್)

ಪ್ಲಾಂಟ್ ಎಂಜಿನೀಯರ್

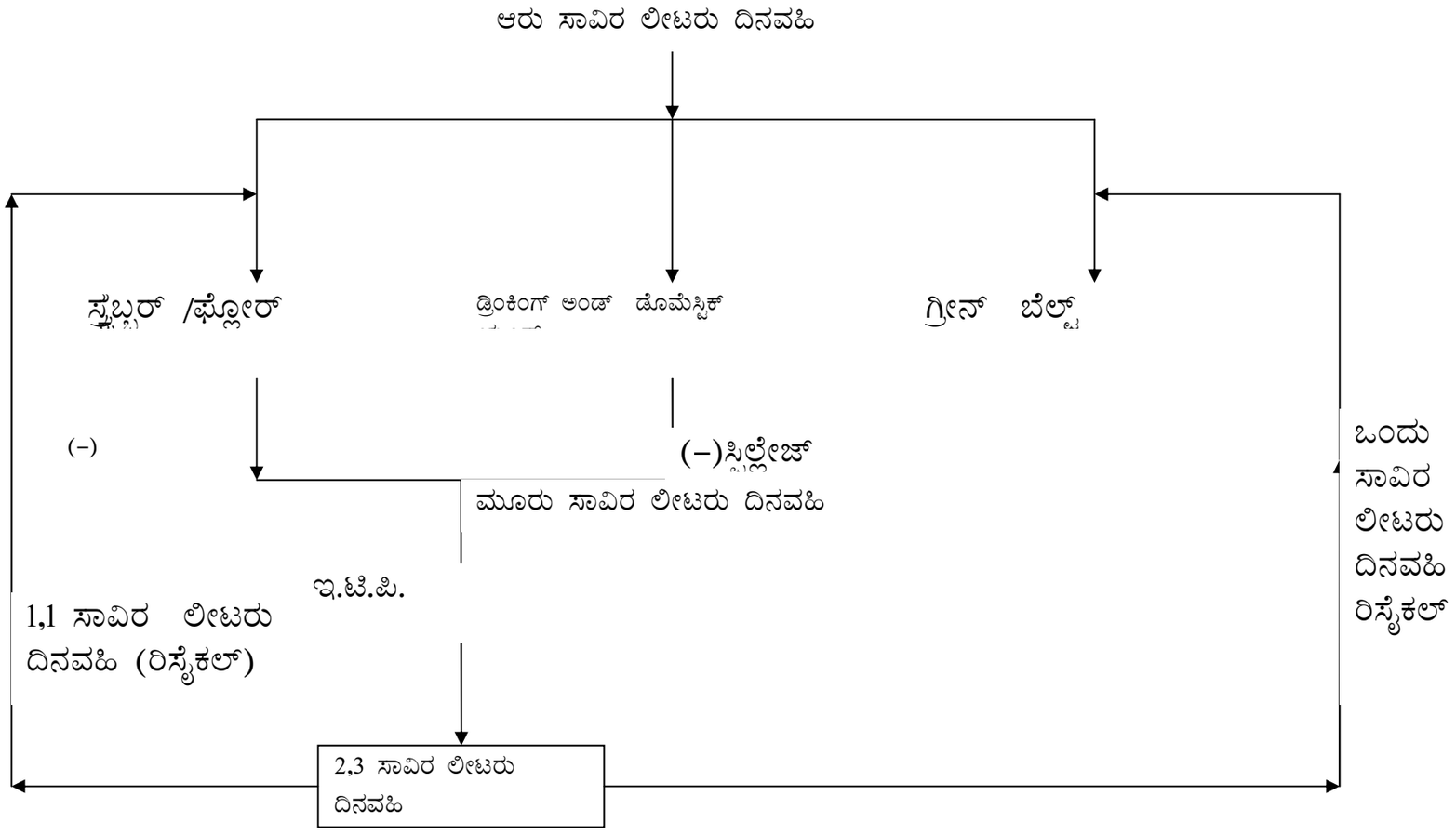
ಮೆಷಿನರಿ ಮೈಂಟೆನೆನ್ಸ್ ಪರ್ಸನಲ್ ಸೇಫ್ಟಿ ಸಿಸ್ಟಮ್ಸ್ ಆಕ್ಯುಪೇಷನಲ್ ಹೆಲ್ತ್ ಪ್ರೋಗ್ರಾಮ್ಸ್ ಸೋಷಿಯಲ್ ಮತ್ತು ಹೆಲ್ತ್ ಪಬ್ಲಿಕ್ ಗ್ರೀವೆನ್ಸಸ್ ಸರ್ವೆಲೆನ್ಸ್

ಪ್ಲಾಂಟ್ ಸೂಪರ್ವೈಜರ್

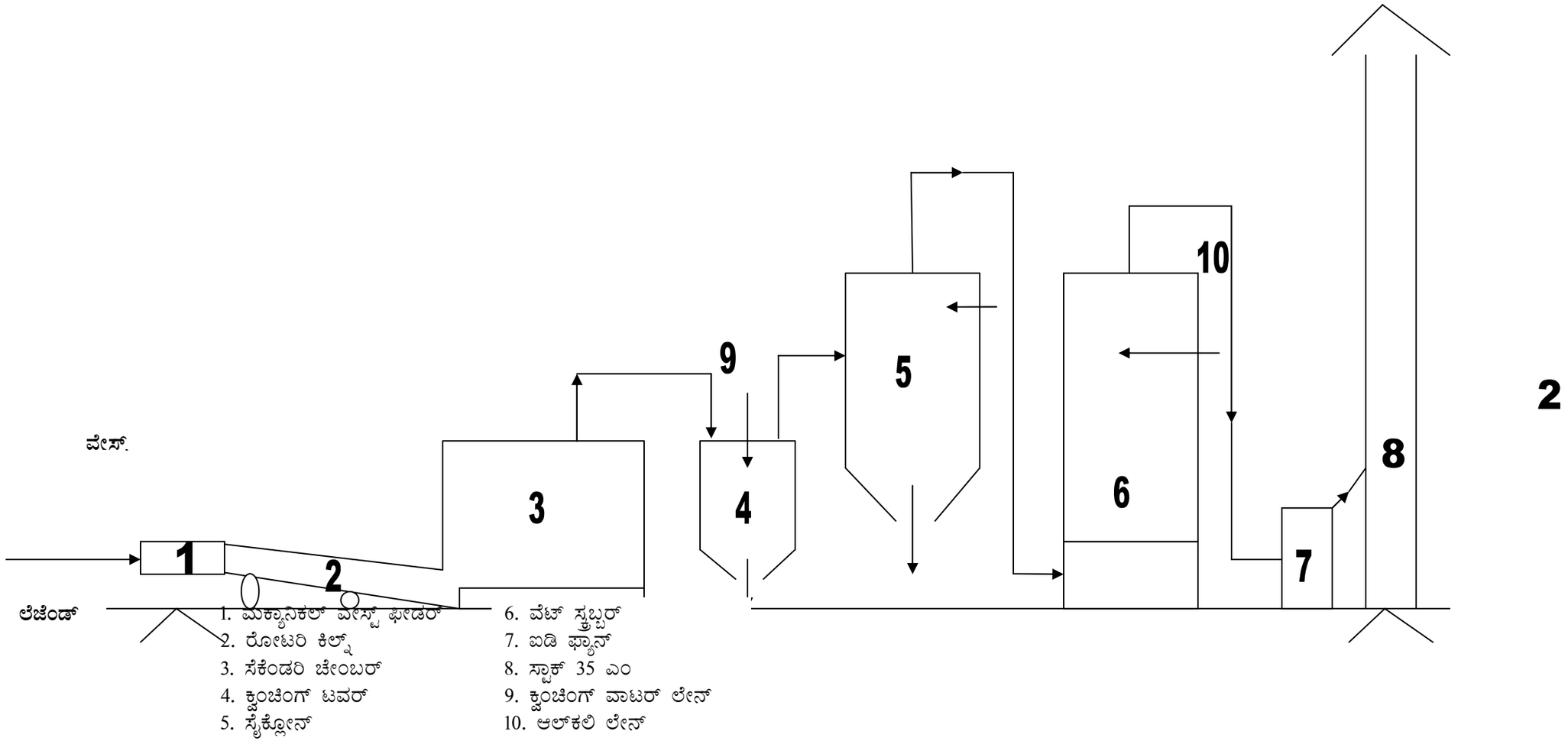
ಎ.ಎಫ್.ಆರ್. ಪ್ರೊಡಕ್ಷನ್ ಆರ್.ಕೆ.ಇನ್ಸಿನಿರೇಟರ್ ಎಮಿಷನ್ ಮಾನಿಟರಿಂಗ್

ಫೆಸಿಲಿಟಿ ಆಫೀಸರ್

ಗ್ರೀನ್ ಬೆಲ್ಟ್ ಡವಲಪ್‌ಮೆಂಟ್ ರೈನ್ ವಾಟರ್ ಹಾರ್ವೆಂಸ್ಟಿಂಗ್ ಸ್ಟ್ರಕ್ಚರ್ಸ್ ಸ್ಟಾರ್ಮ್ ವಾಟರ್ ಡ್ರೈನೆಜ್



ಚಿತ್ರ 7 ವಾಟರ್ ಬಾಲೆನ್ಸ್



ಚಿತ್ರ 4 ಸ್ಕ್ಯಮ್ಯಾಟಿಕ್ ಆಫ್ ಇನ್ಸಿನಿರೇಟರ್ (10 ಟಿ.ಪಿ.ಡಿ.) ರೋಟರಿ ಕಿಲ್ನ್ ಅರ್ಜಾಡ್ಸ್ ವೇಸ್ಟ್ ಇನ್ಸಿನಿರೇಟರ್