

### 7.2 R & R ACTION PLAN

There is no R & R action plan because proposed expansion shall be taken up in existing sugar factory premises of Siddhanath Sugar Mills Ltd, (SSML), Solapur.

### 7.3 RISK ASSESSMENT REPORT

The techniques of risk impact analysis differ in detail from case to case, but nevertheless always follow the same basic principles, viz. the identification of a full and representative set of failure cases which could cause major disasters. Determination of geographical area in which more than a specified level of damage could occur in each failure case. Each of these steps involves considerable analysis.

The preliminary hazard analysis (PHA) is performed as the first step in a Hazard Assessment. It starts with the type of accident involving toxic, flammable, explosive material. The procedure specifies system elements (plant components such as storage tank) or event (overloading of a tank) that can lead to a hazardous condition.

#### 7.3.1 Risk Analysis

Risk to human health is inherent. It is safe only when the installation is dismantled at the end of its useful life.

The following principles should be used as guidelines for the selection of risk criteria-

1. The increase in risk, caused by the presence of the plant to local community (i.e. neighboring public) should be negligible in comparison to the risk they already have in their daily life.
2. The work force on the plant should be expected to accept and deal effectively a potentially greater risk than the members of the local community since the work force have been trained to protect and avoid handle the hazardous chemicals and thus reducing the actual risk to themselves.

The risk criteria considered by Green A.G. (1982) are given as below:

1. Risk to plant: This risk minimizing is to be top priority to the extent that it is proved beyond doubt that risk to life has been reduced to the minimum and further reducing this may not be justified. Under this consideration, the risk to economic damage may be preferred over risk to life.)
2. Risk to public and employees: The scale used for risk to employee and public is Fatal Accident Rate (F.A.R.) or more commonly Fatal Accident Frequency Rate. (F.A.F.R.). The F.A.R. and F.A.F.R. Is defined as number of deaths from industrial injury expected in a group of 1000 men during their working period.

#### 7.3.2 Risk Assessment

##### Evaluation of Risks-

The recognized method for evaluation and management of risk are-

- Comparison with adherence to good and safe operating practices in design, construction, operation, maintenance, and as per the statutory laws and good organization practices.
- Predictive hazard and risk analysis by studies like HAZOP, HAZAN, failure mode and effects analysis, Event/fault tree analysis, effects and damage calculation, risk contours etc.

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- Dispersion models which try to predict concentrations at ground level and other attitudes of emissions after taking into account atmospheric conditions.

### Based on risk assessment, minimize/ avoid risk by

- Providing the necessary warning system and automatic quick action.
- Minimizing inventories of hazardous raw materials, finished products and chemicals.
- Process modification, installing adequate instrumentation and interlocks to minimize hazards or eliminate them.
- Selecting alternative safer process.
- Equipment- replacement/ up gradation/ protection by sprays etc.
- Quick isolation and release of contents to flare, detoxification etc.
- Training of personnel on emergency procedures shall be conducted regularly like mock drills, safety audits, table top discussions, reviewing and updating the disaster management plan.
- Improving infrastructure
- Arranging mutual-aid with other industries nearby.
- Providing green belt around factory.
- Monitoring of air quality in the area and of emission and effluents arising out of normal operation.
- Analyzing the risks (Fire, Explosion Gas cloud, Leak) and consequences arising out of abnormal operation.
- Identifying the impact on environment and neighboring population due to operations as well as other activities and suggest measures to bring down the risks and environmental pollution.

### Common Failures-

- ♣ Inadequate design against internal pressure, external forces, corrosion and temperature.
- ♣ Mechanical failure of pipe, containers, elbow due to corrosion, impact, liquid expansion etc.
- ♣ Failure of manual and automatic control system and safeguards.
- ♣ Failure of safety system
- ♣ Weld failure, gasket failure
- ♣ Poor operation and maintenance

## 7.4 AREA IN THE FACTORY WHERE POTENTIAL AND MAJOR FIRE HAZARD CAN TAKE PLACE AS FOLLOWS

### 7.4.1 Sugar Manufacturing Plant

Sugar production plant does not pose any serious Risk and Hazard management problems, except for the following areas of concern.

#### A) Production and handling of Sulfur Dioxide (SO<sub>2</sub>):

Special care and attention is needed in the production and handling of SO<sub>2</sub>.

SO<sub>2</sub> is produced by Sulfur burning and is used for Sulphitation of Sugar solution. This is area of concern because of hazardous properties of SO<sub>2</sub> and exposure due to possible leakages.

SO<sub>2</sub> causes severe respiratory tract, eye and skin burns and may cause damage to the following organs: lungs, upper respiratory tract, skin, eyes due to inhalation.

### B) Fire, particularly in the storage area of Bagasse:

Bagasse generated from cane crushing is dried and stored in form of bales in huge quantities. The bagasse storage yard is more prone to fire hazard.

Refer **Appendix 7.2** for Flow Charts of Bagasse Storage Yard & Fire Fighting Arrangement for Sugar & Co-gen.

#### 7.4.2 Co-generation Plant

The co-generation plant after expansion will have 26 MW capacity. This will have 75 TPH of two boilers with 72 kg/cm<sup>2</sup>g working pressure & 510°C+/-5°C superheated steam temperature configuration is employed, with one matching 12 MW Double Extraction Condensing (DEC) type Turbine of working pressure configuration of 70 kg/cm<sup>2</sup> & temperature 500 °C.

The major hazard of production and handling of steam at very high pressure of 72 bar and 500 °C is minimized as high pressure boilers are installed, maintained and tested as per IBR standards. The plant is fully automated and sufficient alarms and interlocks have been provided to take care of any abnormal condition or variations.

### 7.5 RISK ANALYSIS AND HAZARD MITIGATION MEASURES

#### 7.5.1 Sugar Manufacturing Plant

- In Sulfur burning unit SO<sub>2</sub> will be used immediately without any intermediate storage of SO<sub>2</sub>. Thus, there would be no chance of significant quantity of Sulfur-Dioxide leakage and exposure of workers to Sulfur Dioxide.
- Bagasse is baled and stored in the area dedicated for it.
- Bagasse storage area shall be protected by water sprinkling system. All the sprinkler system shall be equipped with water flow alarms. Apart from water, Carbon di-Oxide and dry chemical powder shall be used for extinguishing fire. CO<sub>2</sub> and DCP type shall be provided as given in, "**SAFETY AND FIRE EXTINGUISHING SYSTEM**"
- Adequate fire fighting capability is in place to mitigate this hazard.
- There are 02 ex-army personnel in the security staff who are trained in fire fighting. They will be training other 10 security personnel in the fire fighting. There is one fire and emergency alarm at the security gate.
- Mock drills are conducted regularly and records are maintained.
- The nearest help for firefighting is available from Solapur 12 kms form the plant site.
- In a sugar factory, hydrant plays dual role of providing water for fire extinguisher and exposure protection. The entire manufacturing facilities shall be protected by adequate number of hydrants. The firefighting piping has been laid out to cover the entire periphery of the storage and entire plant area. Adequate numbers of hydrant outlets have been provided.
- There are total 560 Workers (110 skilled and 450 unskilled) working in the plant. Workers have been issued proper PPEs.
- There is first aid and health center facility with one trained medical assistant available 24 hrs a day. Periodic medical examination of workers is carried out and the record is maintained.

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- Emergency vehicle is available at the factory site for 24 hrs. The nearest hospital is at Solapur, about 12 kms from the plant site.
- Pressure vessels have been designed and fabricated as per the standard code. Pressure vessels are tested regularly as per the requirement of the code, by pressure testing and shell thickness measurements and record is maintained.

### 7.5.1.1 Storage of Molasses

1. Molasses shall be stored in good quality and leak proof steel tanks. Bund walls shall be constructed around the tank.
2. Continuous mixing of molasses shall be done.
3. If there is increase in temperature beyond 30°C external cooling of tanks should be provided. A temperature recorder shall be provided to the tanks.
4. If there is leakage –
  - a) Leakage shall be washed out and diluted.
  - b) Replacing of leaky gaskets, joints, shall be done strictly by following work permit system.
  - c) Leakage of pipelines, welding repairs should be attached /attended /carried out outside the plant. The necessary hot work permit shall be issued after taking necessary precautions and fire fighting measures for onsite hot work, by the concerned authority before any hot work in undertaken
  - d) Leakage through gland shall be regularly attached/ checked and attended. It shall be perfectly/completely stopped by adopting improved techniques such as mechanical seals.
  - e) To attend all major leakage in tanks the following procedure shall be followed
    - i) Transfer the material to other tank.
    - ii) Prepare the tank for welding repairs by making sure that it is positively isolated with blinds from other vessels and ensuring that it is free of the chemicals and gases by air analysis before any hot work is undertaken and this shall be done by skilled workers.

### 7.5.2 Co-generation Plant

- All process equipments would be properly maintained.
- The control room housing, the electric recording and control instrument must be completely closed from all sides, if located within the plant area. The entrance to this room would be preferably from outside.
- Smoking or use of naked flame should not be allowed within 30 M of the manufacturing, storage and handling facilities of Bagasse.
- Welding and gas cutting operation should be carried out only after obtaining a hot work permit. When it becomes necessary to conduct monitoring with appropriate gas detectors, it shall be ensured that no gas concentration exists in the equipment or in the vicinity.
- If there is an accident in power house the following procedure should be followed.
  - a. Shut down the power house
  - b. Using fire extinguishers, repair the faulty part, and cable under the supervision of an Assistant Engineer.

#### • Boiler Operations

- (i) Personnel protective equipments should be given to workers.

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- (ii) Boiler standards and maintenance will strictly as per the Boiler Act/Rules and regulations. It will be operated by the certified Boiler Operators as per the rules applicable.
- (iii) Pilot lights shall be provided on electrical panel boards.
- (iv) Hand operable fire fighting cylinders shall be provided.

### **7.6 DISASTER MANAGEMENT PLAN**

A major disaster in a work is the one, which has potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the - works. A disaster would normally require the assistance of outside emergency services to handle it effectively. Whatever are the causative factors, like plant failure; human error; earthquake; vehicle crash; sabotage etc., they will normally manifest in three basic forms viz, fire, explosion, and / or toxic release.

#### **7.6.1 Scope**

Each industry is expected to take steps to assess, minimize and wherever feasible eliminate risks. However, accidents may still occur in spite of the measures taken by an industry. Therefore, disaster planning becomes a necessary element for mitigating the effects of a major accident/ disaster.

Elimination will require prompt action by operating staff, the staff on various emergency teams and the outsiders when called. Often quick plant stoppage, isolation and pressure release from the affected equipment, operating emergency sprays etc. are called for. Minimizing the effect on people can be achieved by prompt rescue, evacuation, rehabilitation and communication.

In all these steps, SPEED IS THE ESSENCE. Thus, in any disaster the fire brigade should report in 2 minutes and fire fighting should start within 4 minutes.

Disaster management planning is not a substitute for good operating / maintenance / design practices. It is an aspect of Safety Management. Every industry, as mentioned above, should minimize risks by adherence to safe practices and by meeting all legislation.

Although On-site and Off-site Disaster Management planning is different it should be consistent and should complement each other. On-site disaster management planning is the responsibility of Site Management (Occupier). The District Authorities and the Directorate of Industrial Safety and Health have the responsibility for the Off-site Disaster Management Plan of the district.

All companies will need to have a round- the-clock duty team to manage disasters. The duty team will include several functions and members depending on the size of the organization and would be headed by a technically qualified as well as a trained individual.

#### **7.6.2 Objectives of the Disaster Management Plan**

Disaster occurring at any factory or installation may cause injuries or loss of life or damage to the property or disruption inside as well as outside the premises. The disaster could be a result of abnormal functioning within the facility or caused by third parties or by natural factors. If an emergency becomes uncontrollable and leads to damage to life and property in the industry and it's neighborhood, it may be defined as the disaster.

**The objectives of disaster management plan include the following**

1. Controlling the disaster, localizing the disaster and eliminating the hazard.
2. Welfare of person managing the disaster.
3. Head count and rescue operations.

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4. Treatment of injured.
5. Safeguarding others by timely evacuation.
6. Minimizing damage to property and environment.
7. Informing and assisting relatives.
8. Informing and collaborating with statutory authorities.
9. Informing the news media.
10. Preserving records and organizing investigations.
11. Ensuring safety of the works before personnel reenter and resume work.
12. Investigating and taking steps to prevent recurrence.
13. Resorting normalcy.

### **The prerequisites for a good disaster management plan have been given below**

1. Management's commitment to safety.
2. Emergency organization.
3. A good Public Address System in the complex with one or two jeeps with PA system for use in surrounding areas also.
4. "Duty Team" for silent-hour coverage, approved emergency control centers and assembly points.
5. Written guidelines for the duty team members.
6. List of key personnel, experts, doctors, village leaders, authorities with their locations and telephone numbers (both office and residence).
7. Clear-cut definition of role of individuals.
8. Adequate means of communication with good back-up facility for telephone system. Also, alternative methods of communication like wireless, messengers etc. should be available
9. Training, Regular rehearsals including alarms at least once / quarter.
10. Fire and safety manuals (Both common and plant wise).
11. Operating and Maintenance Manuals.
12. Strong conviction that "the prevention is better than cure". Therefore, more emphasis should be made to prevent disasters.
13. Warehouse safety manual.
14. Transport emergency cards (Tremcards) for the products transported by road.
15. Disaster Management Plan (both On-site and Off-site)
16. Rehearsals of the disaster management plan (disaster control plan) and modifying / updating the same, if necessary. The timing of events, communication failures etc. should be noted and analyzed for improvement. The plan may therefore, have to be regularly discussed and updated.
17. Division of each large factory into 'Safety Districts' for better safety management.
18. Availability of emergency 'Instalite' (emergency light) to take care of power failures.
19. Mutual aid scheme, if feasible.
20. Provision of antidotes, emergency medicines and beds in nearby hospitals.
21. Liaison with outside agencies and civic and government authorities for mitigation of the effects of a disaster.
22. Round- the- clock availability of trained first-aid personnel.
23. Standby communication system in case the telephone system is affected, e.g. Walkie-talkie, radio telephone, mobile phone etc.

### **Elements and Essentials of Disaster Management Plan**

1. Vulnerable areas of the plant where disasters are likely to originate should be identified and planned measures to deal with the same should be decided.

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2. Organization, i.e. appointment of key personnel with their duties and responsibilities should be done. This should cover personnel by their designation and it should not only consider the normal working but shifts and holiday work also.
3. Communication mechanism for raising the alarm as well as that for the interaction within and outside works should be provided.
4. Roles and responsibilities of other individuals, as mentioned below, need to be defined clearly.
  - Fire fighting
  - Medical
  - Rescue
  - Engineering support
5. All others not taking part in emergency handling operations.
6. Location of emergency control center and assembly points should be precisely and carefully planned.
7. Check -list for sequence of operations to be followed should be prepared.

### **7.6.3 Identification / Assessment of Situation**

It is essential that the situation is identified at the earliest possible time and judged correctly and if necessary, the emergency is to be declared.

The Shift In-charge, who is at all times in the mill house, shall identify situation of the hazard or calamity and report immediately the same to Sugar factory Manager and shall also sound the alarm bell provided in each of the sections.

Under this plan, the Managing Director takes charge of the situation. No sooner, he gets the information from Shift In-charge, he shall move to the place of hazard / calamity. He shall assess the situation and decide to declare emergency either in that particular section or the entire plant and sound alarm bells accordingly.

If the emergency is to be declared only in one plant, the other plants will work normally.

He shall take immediate steps to control the situation.

#### **7.6.3.1 Action Plan**

He shall initiate all such actions that are essential at the distillation house / fermentation house / shop floor etc. which would include-

Evacuation of all the personnel on the shop floor who are not required for controlling the situation or hazard.

Immediate grasping of gravity of the problem / hazard and issue or giving of instructions to the concerned teams as laid down to act in a manner required to control the situation.

In case of fire, the help of fire force should be immediately sought and put into action. Simultaneously, the workman trained in the fire fighting procedures shall be called to extinguish the fire.

Following teams of personnel are formed to tackle a situation when an emergency arises-

#### **TEAM - A**

The Sugar factory In-charge along with Shift Supervisor of the sugar factory and other supervisory staff shall put off the fire or the hazard as the case may be.

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### **TEAM - B**

The Shift Operator of the Sugar factory, the Sugar factory In-charge, the Excise Assistant in the office, Security Officer and Labour Welfare Officer shall be responsible for contacting the fire brigade personnel and arrange for medical assistance, if required.

### **TEAM - C**

The Maintenance In-charge and his colleagues shall form another team and take charge of the safety appliances, tools and implements required to control the situation. They will rush to the spot for taking further instructions from the declarer / controller of emergency.

### **TEAM - D**

The union office bearers shall form another team and should see that none of the workmen crowds around or nobody comes nearer to that place of emergency. This team would also ensure that all the available manual help required by the declarer / controller of emergency is provided to him.

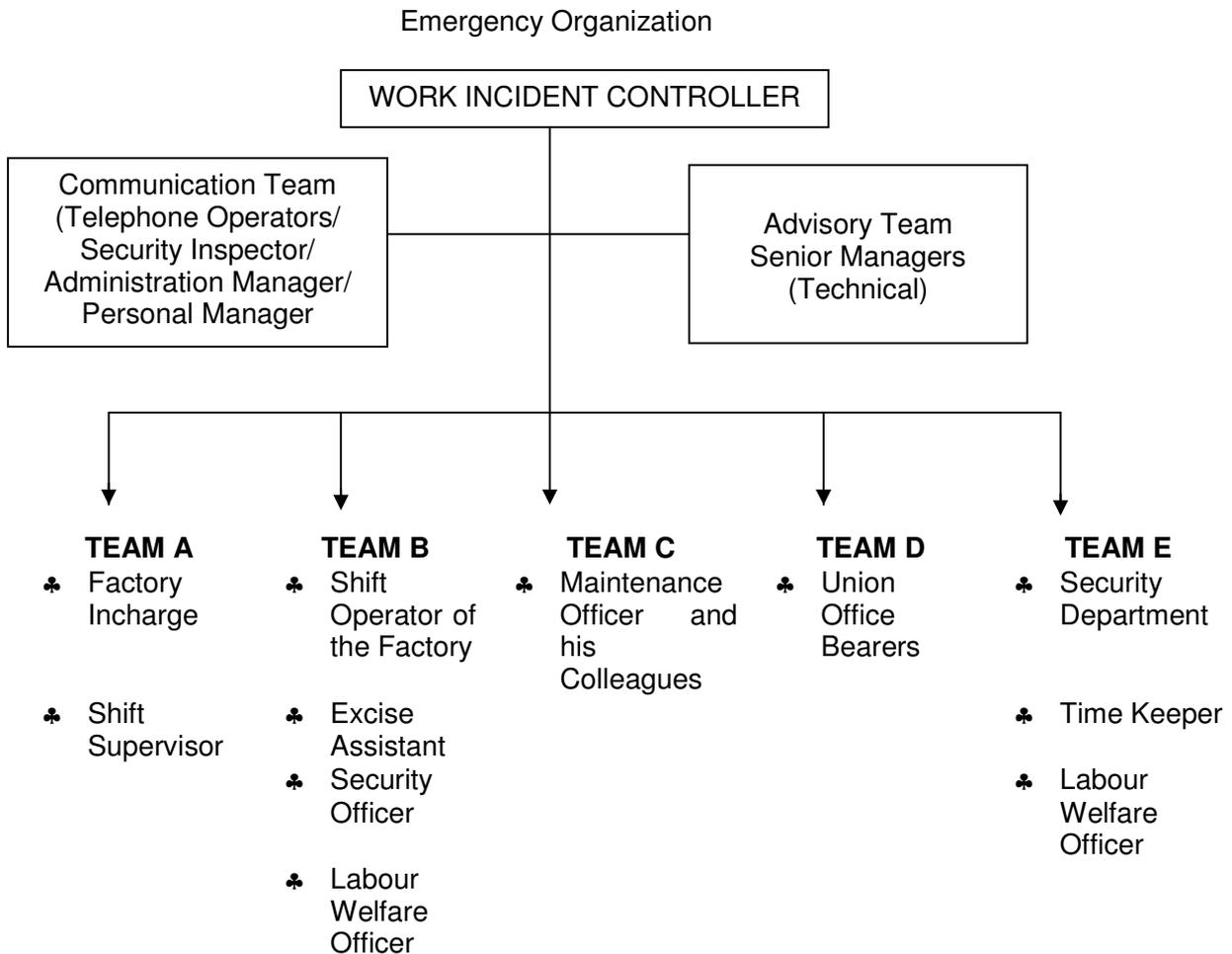
### **TEAM - E**

The Security Department, the Time Keeper, and Labour Welfare Officer shall form another team. They shall be available at the office and contact the personnel at the head office for assistance to the declarer / controller of emergency. It shall be the responsibility of this team to refer, immediately, to the checklist of names, addresses, telephone nos., of the authorities such as Director, Joint Director of Industrial Safety and Health, Boiler Inspector of Factory, Commissioner of Police, Police Station, Fire Brigade, Company Hospital Doctors, Private Doctors and Directors of the Industry and contact for assistance, if required.

At all times, one vehicle is made available at the gate of the factory for emergency. All the personnel required shall be brought to the factory in the personnel vehicles of the officers.

The hooter siren, that is provided, shall be used when a total emergency is to be declared for the entire factory.

**Emergency Organization Structure**



**7.6.4 Emergency Shut Down of Various Sections**

Only hazard that is expected in the Sugar factory and Co-gen plant is fire. The following steps may be followed.

Put off the main supply.

**7.6.4.1 All manufacturing Section:**

Shut down the boiler section and control the steam supply / movements.

**7.6.4.2 Control Room:**

The security office shall function as a control room as the same is ideally situated nearer to the main gate and away from the plant. Thus, there shall be no risk as regard to the vapour of any toxic substances affecting the security office. However, if there should be a situation where / when the entire premises has to be declared as emergency, the control room shall operate from the premises which is out side the main gate.

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Since the entire plant is provided with good quality electrical fittings, there should be no anxiety as regard to switching on or off the motors and no sparks will occur. However, the declarer / controller of emergency shall decide, depending on the situation, whether to use generator power or the M.S.E.B. Power.

In case the entire lighting has to be switched off to meet such an eventuality, the stand by generators, provided near the office, shall be started and the flood-lights shall be used to tackle the situation during the nighttime.

### **7.6.4.3 Evacuation of Personnel:**

When a major accident occurs and if there are cases of workmen or supervisory personnel fainting or losing consciousness or any other type of accident, it shall be the responsibility of Team D to evacuate them and carry in the vehicles to the nearest dispensary after providing necessary first aid.

There are well-planned roads in and around the plant in the factory premises and they should choose the safest and shortest route to come out from the plant. The selected route should be kept clear by Team E at all the times

### **7.6.4.4 Accounting of Personnel:**

It shall be the responsibility of the Team E to immediately take stock of the personnel on duty and cross check the personnel who have come out of the plant or have got stuck up. This team shall co-ordinate with Team D to ensure that all the personnel are accounted for. It is also essential for Team E to counter check the security if any visitor or transport workers have entered the plant and if so they should also be accounted.

### **7.6.4.5 Controlling the Disaster**

The declarer / controller of disaster shall take steps to train all the teams and shall draw up an "Action Plan" forthwith. The Sugar factory In-charge is earmarked as "WORK INCIDENT CONTROLLER" and shall act as an in-charge at the site of the hazard to control entire operations.

### **7.6.4.6 Implements for Repairs and Safety Gears**

The declarer / controller of disaster along with the work incident controller shall immediately prepare a list of safety gear, tools and other implements required to control the emergency situations in respect of-

1. Fire
2. Bursting of Boiler
3. Short Circuiting

This list shall be submitted to the Managing Director for approval and the material should be brought immediately.

Also, It shall be the responsibility of "Work Incident Controller" to ensure that a separate set of implements, safety gear and tools are placed in a cupboard easily accessible in the workshop/at the work place and these shall be used only when emergency is declared in the plant.

### **7.6.4.7 Arrangements for Medical Treatment**

Most of the workers are trained in first aid and fire fighting procedures. The office team shall co-ordinate with these workers, trained in the first aid, and shall get them ready with necessary first

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aid material so that the injured workers are attended for first aid immediately and then shifted to the nearest dispensary or treated in the factory dispensary as the case may be.

### **7.6.4.8 Training and Rehearsals**

It is essential for all the teams to act in unison and with patience. They are required to be trained to obviate any confusion that might arise due to emergency.

It is responsibility of the declarer / controller of emergency that the teams are given training in their respective areas at least once in two months.

For fire fighting training, the Government Fire Force will give training and for first aid training, the Red Cross Association will train the personnel.

### **7.6.4.9 Law and Order**

The Police shall be informed, immediately, by the declarer / controller of emergency to ensure that law and order situation is kept under control.

The Joint Director/ Assistant Director of Industrial Safety and Health, Pollution Control Board authorities shall also be informed.

In case of casualties, information should be sent to the nearest relatives of the affected people.

If information is to be given to public or press, the public relation manager of the industry is authorized to do the same.

### **7.6.4.10 All Clear Signal**

Once the disaster is controlled and the normalcy is restored completely and when the declarer / controller of disaster is of the opinion that there is no further hazard involved and the work can go on normally, he shall then declare all clear signal.

All the workers in the plant shall be given proper training to use the signals both at the time of declaring the disaster and at the time of clearing the disaster.

## **7.7 ON-SITE EMERGENCY PLAN**

### **7.7.1 Plant Emergency Organization**

#### **1) Designated Persons In-Charge**

- a) Members of Team A- Factory In-Charge, Shift Supervisor & Other Supervisory Staff
- b) Members of Team B- Shift Operator, Factory In-Charge, Excise Assistant, Security Officer, Labour Welfare Officer
- c) Members of Team C- Maintenance In-Charge and his Colleagues
- d) Members of Team D- Union Office Bearers
- e) Members of Team E- Security Department, Time Keeper and Labour Welfare Officer

#### **2) Functions of Designated Persons**

In addition to the specific responsibilities, assigned to various Team Members, mentioned earlier following are the general functions to be performed by the designated persons-

- a) To communicate & report the clear position of a Disaster to Key Persons of the Factory.

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- b) To communicate & co-operate with other departments / aspects like security, safety of victims etc.
- c) To minimize the extent of Disaster by taking all possible measures which, are in control.
- d) To minimize the exposure of Disaster to human beings.
- e) To save property and valuable things as far as possible.

### 7.7.2 Area Risk Evaluation

- a) Contacts at Other Sites – Head Administration Office in Solapur City.
- b) Nearby Residence and Population Center - The village Tirhe is located at the proposed expansion of Sugar Factory and Co-gen plant
- c) Established Procedures for Notification to Other Sites - Notification to other sites would be done through Telephone, Wireless System, Cell Phones and by Personal Messaging.

### 7.7.3 Notification Procedures & Communication Systems

- a) Communication Equipment like Telephone, Wireless System, Cell Phones and Personal Messaging would be employed
- b) The families of injured employees would be notified by Telephone, Personal Messaging and through Verbal Communication.

### 7.7.4 Emergency Equipment and Facilities

The following emergency equipment & facilities would be provided-

#### 7.7.4.1 Emergency Cupboard

An emergency cupboard will be available in all plant areas. This cupboard should contain certain number of various personal protective equipment (PPE) for use in case of disaster. These items kept in the cupboard should be used only during an emergency and not under normal working conditions.

A printed or typed list of items available in the cupboard should be displayed on the cupboard. The key of emergency cupboard should be available with the Shift In-charge.

#### The following items may be kept in the Emergency Cupboard

Table No. 7.1

Sr. No.	Item	Quantity
1.	Air-line mask set	2 sets
2.	Self-contained breathing apparatus	1 set
3.	Safety belt with life-time	1 set
4.	PVC gloves	2 pairs
5.	Leather gloves	2 pairs
6.	'Flextra' or asbestos gloves	2 pairs
7.	PVC Suit	2 pairs
8.	Electrical rubber gloves	2 pairs
9.	Safety torch	2 Pieces
10.	Safety goggle	2 Pieces
11.	Face-shield	2 Pieces
12.	Ear-muff	1 Set

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Sr. No.	Item	Quantity
13.	'Flextra' / asbestos blanket	2 Nos.
14.	Manila Rope 100- meter long bundle	1 No.
15.	Resuscitator	1 No.
16.	Safety helmet	2 Nos.

This item should be examined once a week by the safety observer to ensure that all the items are available and that they are in good condition. Items, defective must be replaced immediately.

### Requirement of Equipment and Other Materials

1. Helmets for the Work Incident Controller and others
2. Megaphone (workable hand-held PA system)
3. Walkie- Talkie/ mobile phones/ pagers
4. Stock of fire fighting material.
5. Note books/ pads and pens/ pencils
6. Sign boards
  - Assembly point
  - Emergency control center
  - Road closed

#### 7.7.4.2 Fire Fighting Equipment

The fire fighting equipment - viz. (1) Fire Buckets, (2) Fire Extinguisher Cylinder; CO<sub>2</sub> Water Expelling type; Class-A, (3) Fire Extinguisher Cylinder; Dry Chemical Powder Type; Class-B & C, (4) Water Connections in sufficient numbers and a 200 Ft. Emergency Water Hose – would be provided at required places. Here, various vulnerable locations in the factory, probable causes & chances of occurrence of fire, its Class etc. would be given in-depth consideration. The fire fighting facility would be provided as per OISD 117 norms.

#### 7.7.4.3 Emergency Medical Supplies

Sufficient number of First Aid Boxes would be located at appropriate and easily accessible locations. The First Aid Box would contain Burn Relief Sprays and Ointments, Bandages, Antiseptic as well as Pain Relief Medicine.

#### 7.7.5 Training and Drills

##### 7.7.5.1 Knowledge of Chemicals

Every worker, working in a particular section, would be given a thorough knowledge of all the chemicals involved/ handled in that section, their reactions as well as properties etc. Also they would be instructed regarding the chemical spillage and its waste disposal practices.

##### 7.7.5.2 Location of Fire Fighting Equipment

Every worker would be given clear-cut information regarding the location of Fire Extinguishers, Fire Buckets, Water Points etc.

##### 7.7.5.3 Use of Fire Fighting Equipment

Every worker would be trained with respect to nature and utility of Fire Fighting Equipment, its type and class of fire for which it is to be used.

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**7.7.5.4 Use of Personal Protective Equipment (PPE)**

Every worker would be trained in using the PPE such as safety helmets, hand gloves, nose mask, goggles etc.

**7.8 OFF- SITE EMERGENCY PLAN**

Since the only hazard that is expected in the proposed expansion industry is fire and is normally contained within the premises no OFF-SITE EMERGENCY PLAN is needed. However, in case the hazard spreads out-side the premises Team E shall communicate to the District Magistrate, Commissioner of the Police, Control Room and inform the situation as OFF-SITE EMERGENCY.

It shall be the responsibility of the Police Personnel to look after the law and order, traffic control, evacuation of workers and other personnel.

They should also advise, through public address system, the localities that are likely to get affected and the steps to be taken.

**7.8.1 Information to Local Authorities**

It shall be the responsibility of declarer / controller of emergency to inform the Local Panchayat Official regarding the likely hazards from the industry and the steps to be taken when there is an Off-Site Emergency. It is preferable that the Local Panchayat Officials are also trained, on simple protective methods, through demonstrations.

**Table No. 7.2  
Emergency Action Code**

Emergency Action code scale For Fire or Spillage 1: Jets 2: Fog 3: Foam 4: Dry Agent			Notes for guidance- FOG: In the absence of fog equipment a fine spray maybe used. DRY AGNT: Water must not be allowed to come into contact with the substances at risk. V: Can be violently or even explosively reactive. FULL: Full body protective clothing with BA. BA: Breathing apparatus plus protective gloves. DILUTE: May be washed to drain with large quantities of water. CONTAIN: Prevent, by any means available, the spillage from entering drains or water course.
P	V	FULL	
R			
S	V	BA	
[S]		BA FOR FIRE ONLY	
T		BA	
[T]		BA FOR FIRE ONLY	
W	V	FULL	
X			
Y	V	BA	
[Y]		BA FOR FIRE ONLY	
Z		BA	
[Z]		BA FOR FIRE ONLY	
E	CONSIDER EVACUATION		

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**Table No. 7.3**  
**Performa Information in Connection with Formulation of**  
**On Site and Off Site Emergency Plan**

1.	Name of the unit	<b>'Siddhanath Sugar Mills Ltd. (SSML)'</b> Proposed expansion of Sugar factory from 2500 TCD to 6000TCD and Co-gen plant from 12 MW to 26 MW.
2.	Address of the unit	Gat No. 167/A - 1, 168/A- 1, At Post Tirhe, Tal.: North Solapur, Dist.: Solapur,
3.	Name, address and telephone no. of occupier	Mr. S. S. Jadhav (General Manager)
4.	Maximum no. of persons working.	In all shifts- 110 (Skilled Workers) 450 (Staff Workers)
5.	Hazardous process and operations conducted in the premises.	i. High pressure steam boiler ii. High pressure & high speed steam turbine iii. Bagasse yard where large quantity of flammable material is stored. iv. Bagasse carriers and conveyors.
6.	Possible hazard anticipated.	i. Fire hazard due to the storage of H.S.D. which is used in D. G .set. ii. Explosion in boiler drums due to excessive pressure. iii. General electrical hazards iv. General mechanical hazards in rotating parts in compressor. belts, steam turbines etc.
7.	Method used for identification of hazards (please identify the relevant ones)	Hazard, fault free analysis, safety audit, Experience of other industries
8.	Nature of identified hazards	Fire, Explosion, Release of vapours, Release of gas,
9.	Population in the nearby area	10 KM radius
10.	Basis on which the population is arrived at	By considering the population present in the individual localities and also the activities likely to exist in these areas.
11.	List of adjacent factories	NIL.
12.	List of adjacent factories engaged in hazardous process and / or storing hazardous chemicals.	NIL
13.	Normal wind direction	Dominant wind direction is from North- West for the study period from March 2014 to May 2014
14.	List of possible accidents, effects of which remain within the premises.	i. Burning of pressure parts in steam boiler. ii. Mechanical contact injuries at rotating Machineries. iii. Electrical hazards.
15.	List of accidents, effects of which will be felt outside the premises.	Nil
16.	The number of people likely to be	Maximum of three to five persons are exposed to

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	affected by each of the possible accidents.	any of the above accidents.
17.	Name in order of priority of the declarer of emergency.	<ul style="list-style-type: none"> <li>i. Managing Director</li> <li>ii. Factory In-charge</li> <li>iii. Chief engineer</li> <li>iv. Chief chemist</li> </ul>
18.	Mechanisms by which the declarer will come to know about the accident (please Identify appropriate one)	<ul style="list-style-type: none"> <li>i. Phone</li> <li>ii. Messenger</li> <li>iii. The person to get in touch with the declarer</li> <li>iv. Shift Incharge</li> <li>v. Manufacturing chemist</li> <li>vi. Maintenance engineer.</li> </ul>
19.	The person to get in touch with the declarer.	Factory In charge, Shift In charge, Factory Manager, Security Officer and Labour Officer.
20.	Identification of control room	<ul style="list-style-type: none"> <li>i. Office of factory manager</li> <li>ii. Time office</li> </ul>
21.	Facilities available at the control room (please Identify appropriate one)	Telephone Vehicle
22.	Declaration of emergency	Coded siren
23.	Whether workers are trained to recognize the emergency message	Yes, would be trained.
24.	Whether emergency plant shut down procedure used have been generated	Yes, the procedure would be generated
25.	Whether evacuation paths have been identified (please identify appropriate ones)	Yes, the paths would be identified.
26.	Whether independent power supply to evacuation paths provided (please identify appropriate once)	Yes, it would be provided.
27.	Arrangement made for guiding workers to the specified evacuation paths (please specify)	Yes, the arrangement would be provided.
28.	Arrangement for accounting the personnel (please specify)	The emergency team under production/manufacturing chemist is identified as search team for injures person.
29.	Give names of team identified as search team to look for injured workers.	The emergency team under manufacturing chemist is identified as search team for injures person.
30.	Specify various teams identified for controlling the emergency.	A team of five persons under general manager or chief chemist.
31.	Availability of implements for repair (please give details)	<ul style="list-style-type: none"> <li>i. Personal protective such as hand gloves, gum boots, aprons, helmets, safety goggles, etc. for handling toxic and corrosive chemical</li> <li>ii. Fire extinguishing, including dry chemicals, foam type extinguishers, sand buckets, water hydrant lines are used for control of fire.</li> <li>iii. Water showers and eye fountain.</li> </ul>
32.	Arrangement for treatment of Injured	i. In charge of control assume the

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	workers.	<p>responsibility of correct handling and treatability of injured.</p> <ul style="list-style-type: none"> <li>ii. Affected persons are removed to safe, well-ventilated place.</li> <li>iii. If body parts are contacted with toxic or corrosive chemicals they are fluently washed with fresh water.</li> <li>iv. The control team gives premedical aid/ first aid.</li> <li>v. Arrangement is made for immediate shifting of injured person to the hospital.</li> <li>vi. One of the person from control team will accompany the injured person to give necessary background of accident to the doctor and to attend the injured person.</li> </ul>
33.	Arrangement for training of personnel.	<ul style="list-style-type: none"> <li>i. Necessary literature, leaflets, and information regarding the occupational hazards, safety management, handling of emergency would be maintained in the factory for reference to the factory personnel including management, supervisors and workers including the control team.</li> <li>ii. Factory management and supervisory staff would be sent in rotation to institutes engaged in occupational hazard, safety and loss prevention for training.</li> <li>iii. Periodically at least once in 2 years safety experts from the brigade and loss prevention organization would be called to educate and train factory personnel.</li> <li>iv. Training programmes for safety and loss prevention would be arranged within the factory at once in the year using resources locally available.</li> </ul>
34.	Rehearsal, their natures and frequencies	<p>Simulated accidental situations such as fire, leakage of corrosive or toxic gas or liquid, machinery failures would be created and these would be handled. Such programmes would be held at least twice in the year.</p>
35.	Details of hospital ambulance antidotes available at the factory and the hospitals.	<ul style="list-style-type: none"> <li>i. The required anti-dotes would be kept in the factory and in the hospital.</li> <li>ii. The information regarding the chemicals used and the type of risks involved in the factory is indicated to the Government hospital Solapur in advance to obtain correct and prompt services in case of emergency.</li> <li>iii. Pre aid facilities would be maintained in control room and in the factory.</li> </ul>

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		<ul style="list-style-type: none"> <li>iv. Medical oxygen facility is kept in the factory.</li> <li>v. Arrangements shall be made with various ambulance owners in Solapur to obtain their services in case of emergency.</li> <li>vi. There are a few hospitals with round the clock casualty services whose services will be availed by the factory.</li> </ul>
36.	Person from the police dept. to take charge in case of site emergency.	The off-site emergency is unlikely in plant. However, the police station shall be kept informed to take measures in case of off-site emergency
37.	Whether police personnel have been informed of possible hazards.	The police personnel of Solapur shall be informed.
38.	Whether the fire brigade has been informed of the nature of the chemicals and of fires likely to erupt.	The fire brigades of Solapur shall be informed of the possible fire hazards.
39.	Has the fire brigade adequate facilities to control the fire	The government fire brigade at Solapur has the required facilities to control the fire.
40.	Person identified to make statement to the press and informing the relatives of the affected people.	The M.D. will be in charge.
41.	Arrangements for giving information to local authority.	The factory chief engineer shall give written information to the local authorities.
42.	Indicate how the local public, likely to be affected, has been informed of the likely hazard.	Off site emergencies are not possible in sugar industries therefore the situation to inform the public does not arise.
43.	Whether police has been informed regarding the advice to be given to the public in case of accident.	Not applicable as there is no possibility of off-site emergency.
44.	Indicate arrangements to inform Factory Inspector, S.P.C.B. or their nominee.	Telephonic information followed by detailed letter to the local offices and the head offices.
45.	Code for giving all clear signal.	Coded Siren

### 7.9 SOCIAL IMPACT ASSESSMENT

The primary data was compiled through survey of the study area using interview schedule and related technique. For the survey, 'Simple Random Sampling Method' was adopted for collection of data.

From the personal interview conducted it is concluded that, the study area have male dominating society having main occupation as agriculture. Annual income of most of the people is in between Rs. 10,000 to Rs. 50, 000 which shows the economic condition of society is not good. Hence most of the respondent gave positive inclination towards employment opportunities from the upcoming project. Apart from this, the village people also expected developmental facilities such as good paved roads.

The majorities of people were well aware of proposed project and had a positive approach towards same. They also suggested for making provisions for workers health and safety as well as installing pollution control equipments for abatement of pollution

**7.10 Traffic Study**

The present land use surrounding the SSML industry is as follow

- From the study of 10 Km radius area from project site, agriculture land is observed towards the East, South-east and South direction.
- Settlements observed towards the East, North East direction from the project site.
- Solapur city is 12 Km away from the project site

Also there is no any commercial complex, recreational complex, colleges, hospitals and residential complex near the project site. Moreover the Solapur Mangalvedha Highway is at a distance of 0.5 km respectively.

Traffic survey is the study of flow of traffic/vehicles, designing and operating traffic system to achieve safe and efficient movement of vehicles, persons and goods. Traffic studies are carried out to analyze the traffic characteristics. These surveys are conducted to assess the impact of traffic with reference to road safety and carrying capacity of roads.

The site has well developed road network. Raw materials (fuel, Sugarcane etc.) will be procured from various locations in the state and transported to the factory through trucks, trolleys. Similarly Sugar and alcohol produced in the factory is transported to various consumers in and out of the state through trucks and tankers respectively. Vehicles will move mainly through Solapur - Mangalvedha road for transportation of raw material. This road is an asphalted and is well developed. Also proper parking provision has been provided for the additional vehicles during operation/construction phase.

Different classes of vehicles such as cars, vans, buses, trucks, auto rickshaws, motor cycles, pedal cycles, bullock carts, etc are found to use the common road way facilities without segregation on most of the roads in developing countries like India. The flow of traffic with unrestricted mixing of different vehicle classes on the road ways forms the heterogeneous traffic flow or the mixed traffic flow. It is a common practice to consider the passenger car as the standard vehicle unit to convert the other vehicle classes and this unit is called as **Passenger Car Unit or PCU**.

**7.10.1 The Traffic Study was conducted at road (Solapur- Mangalvedha Road) nearby to project site.**

**Table no. 7.4  
Traffic study**

<b>Between Time</b>	<b>Car/Tempo Tractor (With Trolley)</b>	<b>Bus / Truck Tractor</b>	<b>Motor Cycle Scooter / Cycle</b>	<b>Three Wheeler Rickshaw</b>	<b>Bullock Cart</b>
10.00-11.00	176	355	635	150	20
11.00-12.00	160	325	630	152	24
12.00-13.00	165	340	622	140	11
13.00-14.0	170	346	610	160	06
14.00-15.00	150	310	590	162	09
15.00-16.00	155	305	605	130	12
16.00-17.00	173	350	621	146	19
17.00-18.00	166	360	630	176	28
18.00-19.00	145	345	615	172	32
19.00-20.00	130	320	601	125	14
20.00-21.00	110	290	592	149	08
21.00-22.00	80	215	475	119	-
22.00-23.00	30	50	150	-	-

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Between Time	Car/Tempo Tractor (With Trolley)	Bus / Truck Tractor	Motor Cycle Scooter / Cycle	Three Wheeler Rickshaw	Bullock Cart
23.00-24.00	35	50	-	-	-
00.00-01.00	-	-	-	-	-
01.00-02.00	-	-	-	-	-
02.00-03.00	-	-	-	-	-
03.00-04.00	60	251	-	-	-
04.00-05.00	71	219	10	-	-
05.00-06.00	105	224	30	-	-
06.00-07.00	121	281	121	75	-
07.00-08.00	131	264	441	152	05
08.00-09.00	164	391	460	130	11
09.00-10.00	150	326	611	162	30
10.00-11.00	170	330	631	120	14
11.00-12.00	190	371	672	165	27
12.00-13.00	183	326	655	131	19
13.00-14.00	119	346	630	150	12
14.00-15.00	142	372	650	134	12
15.00-16.00	180	380	621	129	17
16.00-17.00	179	391	680	191	24
17.00-18.00	161	364	560	175	21
18.00-19.00	112	295	489	101	29
19.00-20.00	134	349	631	140	20
20.00-21.00	170	381	601	119	12
<b>Total</b>	<b>4387</b>	<b>10162</b>	<b>16499</b>	<b>3855</b>	<b>436</b>
<b>PCU</b>	<b>5483.75</b>	<b>22864.5</b>	<b>5444.67</b>	<b>2120.25</b>	<b>--</b>

**7.10.2 Traffic load due to proposed integrated project**

Following table shows the transportation details of product and raw material required for proposed integrated project

**Table no.7.5  
Product and raw material transportation detail**

Sr. No.	Raw Material / Product	Type of Vehicle	Daily Number of Vehicles	Average Capacity of Vehicle	Daily Quantity of Material
1	Sugarcane	Trucks	232	12 MT	2784 MT
		Tractor Trolleys	100	16 MT	1600 MT
		Bullock Carts	541	3 MT	1625 MT
2	Sugar	Trucks	45	15 MT	800 MT
3	Pressmud	Trolleys	20	10 MT	250 MT
5	Ash	Trucks	95	12 MT	1000 MT
		<b>Total</b>	<b>1033</b>		

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From above number of vehicles during season and off-season operations PCU is calculated in following table.

**Table no. 7.6**  
**Traffic due to proposed project**

<b>Sr. No.</b>	<b>Heavy Vehicles</b>	<b>Number of Vehicles</b>	<b>Equivalent PCU</b>	<b>PCU</b>
1	Trucks	232	2.25	522
2	Tractor Trolleys	100	2.25	225
3	Bullock Carts	541	1.75	946.75
<b>Total</b>				<b>1693.75</b>

Total 1693.75 PCU of traffic will be added due to proposed expansion project. There shall not be continuous flow of vehicles for transportation of raw material and product. Also parking facility is provided for additional traffic due to expansion activity. Proper maintenance of roads will be done as a part of CSR activity. As per MoEF norms the industry has developed (44 %) green belt. Also, under expansion, 6802 nos of additional trees would be planted, which shall help to control air pollution load due to transportation.