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# **Mechanical and Biological Treatment Plant (MBT) in the North of Malta**

## **Application for Permit**

## **Working Plan**

## **Information on Risk Management System**

**February 2011**

## Contents

		Page No
<b>1.</b>	<b>INFORMATION ON RISK MANAGEMENT SYSTEM</b>	<b>3</b>
1.1.	INTRODUCTION	3
1.2.	IDENTIFICATION OF POTENTIAL HAZARDS	7
1.3.	INFORMATION AND INSTRUCTIONS TO THE STAFF	10
1.3.1.	ORGANISATIONAL PROTECTIVE MEASURES	10
1.3.2.	PERSONAL PROTECTIVE EQUIPMENT	11
1.3.3.	PICTOGRAMS	11
1.3.4.	GENERAL RULES FOR BEHAVIOR	11
1.3.5.	HYGIENE	13
1.4.	TECHNICAL AND ORGANISATIONAL PROTECTIVE MEASURES	13
1.4.1.	TECHNICAL PROTECTIVE MEASURES	13
1.4.2.	SAFETY-RELEVANT ALARMS	14
1.4.3.	SAFETY DEVICES	14
1.4.4.	VENTILATION SYSTEM	14
1.4.5.	TRAFFIC ROUTES AND PARKING	15
1.4.6.	STOREROOMS AND MATERIAL STORAGE	16
1.4.7.	MANHOLE AND ROOF COVERS	16
1.4.8.	FIXED LADDERS AND ACCESS/EGRESS	16
	<b>ANNEX 1: EXAMPLE FOR OPERATIONAL RISK ASSESSMENT</b>	
	<b>ANNEX 2: EXAMPLE FOR FMEA</b>	

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## 1. Information on Risk Management System

### 1.1. Introduction

**Risk management** is the identification, assessment, and prioritization of risks (defined in ISO 31000 as *the effect of uncertainty on objectives*, whether positive or negative) followed by coordinated and economical application of resources to minimize, monitor, and control the probability and/or impact of unfortunate events.

Ideal risk management minimizes spending and minimizes the negative effects of risks.

In this regard risk management mainly comprises measures to **avoid** personnel injury or impacts on the environment as well as complying with the law. This includes also to identify (and in as far as possible, to quantify) any risks that may prevent the Project facilities working according to plan.

An important and effective method of risk management is to do risk assessments carried out as design as well as operational risk assessments. This includes:

- Identification of potential hazards
- Identification who could be harmed and how
- Evaluation on risks and decision on precautions
- Information and instructions to the staff
- Technical and organisational protective measures

In creating the documents as a result of risk assessments it will be considered as well :

- (a) Operational activities involved in the task being assessed
- (b) Identifying the hazards and the associated risks
- (c) Using the formula below allocate a rating to each risk identified

#### Severity

- 1 = No Injury, No Damage
- 2 = Minor Injury, Minor Damage
- 3 = Major Injury, Disabling Illness, Major Damage
- 4 = Fatality

**Likelihood**

- 1 = Unlikely
- 2 = Possible
- 3 = Probable

The next stage will be to multiply the severity rating by the likelihood rating to arrive at a risk rating for each hazard. This will produce a number on a scale of 1 to 12. This number shall be entered in the risk rating column on the general risk assessment form. The number in the risk rating column provides an indication of the priority of the risk. For a low risk rating of 1 to 4, the risk can be classed as acceptable. For risk ratings of 6 - 8, consideration if more can be done to lower the risk rating to as low as possible. Where a risk rating of 9 or above is achieved, the task at hand must not proceed and the assessor must be taken to reduce the risk.

After having rated the risks, it will be decided (using the remaining columns), whether or not existing control measures are adequate. If not, appropriate remedial actions need to be considered and recorded.

Closely connected to the design risk assessment is the **failure modes and effects analysis (FMEA)**. This is a procedure in product development and operations management for analysis of potential failure modes within a system for classification by the severity and likelihood of the failures. A successful FMEA activity helps to identify potential failure modes based on past experience with similar processes or equipment, enabling the team to design those failures out of the system with the minimum of effort and resource expenditure. It is widely used in manufacturing industries in various phases of the product life cycle and is now increasingly finding use in the service industry. *Failure modes* are any errors or defects in a process, design, or item, especially those that affect the customer, and can be potential or actual. *Effects analysis* refers to studying the consequences of those failures.

FMEA can provide an analytical approach, when dealing with potential failure modes and their associated causes. When considering possible failures in a design – like safety, cost, performance, quality and reliability – an engineer can get a lot of information about how to alter the development/manufacturing process, in order to avoid these failures. FMEA provides an easy tool to determine which risk has the greatest concern, and therefore an action is needed to prevent a problem before it arises. The development of these specifications will ensure the product will meet the defined requirements and customer needs.

FMEA evaluates three factors. These are: Occurrence, severity and detection.

### Severity (S)

It is necessary to determine all failure modes based on the functional requirements and their effects. Examples of failure modes are: Electrical short-circuiting, gas leakage in and around gas storage tank or blockages. A failure mode in one component can lead to a failure mode in another component, therefore each failure mode should be listed in technical terms and for function. Hereafter the ultimate effect of each failure mode needs to be considered. A failure effect is defined as the result of a failure mode on the function of the system as perceived by the user. Examples of failure effects are: degraded performance, noise or even injury to a user. Each effect is given a *severity number (S)* from 1 (no danger) to 10 (critical). These numbers help an engineer to prioritize the failure modes and their effects. If the severity of an effect has a number 9 or 10, actions are considered to change the design by eliminating the failure mode, if possible, or protecting the user from the effect.

### Occurrence (O)

In this step it is necessary to look at the cause of a failure mode and how many times it occurs. A failure mode is given an *occurrence ranking (O)*, again 1–10.

### Detection (D)

A high detection number indicates that the chances are high that the failure will escape detection, or in other words, that the chances of detection are low.

### Risk priority numbers (RPN)

RPN play an important part in the choice of an action against failure modes. They are threshold values in the evaluation of these actions.

After ranking the severity, occurrence and detectability the RPN can be easily calculated by multiplying these three numbers:  $RPN = S \times O \times D$

This has to be done for the entire process and/or design. Once this is done it is easy to determine the areas of greatest concern. The failure modes that have the highest RPN should be given the highest priority for corrective action. This means it is not always the failure modes with the highest severity numbers that should be treated first. There could be less severe failures, but which occur more often and are less detectable.

After these values are allocated, recommended actions with targets, responsibility and dates of implementation are noted. These actions can include specific inspection, testing or quality procedures, redesign (such as selection of new components), adding more redundancy and limiting environmental stresses or operating range. Once the actions have been

implemented in the design/process, the new RPN should be checked, to confirm the improvements. These tests are often put in graphs, for easy visualization. Whenever a design or a process changes, an FMEA should be updated.

FMEA is also a potential tool to identify risks in design and operation.

## 1.2. Identification of potential hazards

Risk assessment procedures have to be carried out to identify potential hazards and to minimise the risk for employees and all other persons by protective measures as well as by information, instructions and training.

The following sources of danger fundamentally exist in the mechanical-biological waste treatment plant.

### **Mechanical hazards include:**

- Crushing, cutting or seizure by moving machine parts, such as conveyor belts, screw conveyors, pumps, agitators, general drive shafts and motors
- Cutting and piercing due to sharp objects or waste components
- Uncontrollably flying or falling objects (e.g. from conveyor belts)
- Stumbling, slipping and falling (e.g. on/with/onto/from footpaths, stairs, ladders, platforms, soiled floors, snow and ice)
- Suspended loads during installation, maintenance and upkeep tasks
- Automatic run-up of machines with moving parts

### **Chemical hazards include:**

- Toxic and flammable bio-gases (hydrogen sulphide [T+, F+, N], methane [F+], carbon dioxide [X<sub>n</sub>], ammonia [T, N])
- Corrosive sulphuric acid [C] for the acid scrubber
- Corrosive ammonium hydrogen sulphate [C], which is formed as an intermediate product in the production of ammonium sulphate in the acid scrubber
- Noxious iron (II) chloride [X<sub>n</sub>] for the precipitation of hydrogen sulphide
- Illegal disposing of chemicals
- Cleaning agent for RO facility

**Biological hazards include:**

- Danger of infection due to pathogenic germs in the waste delivered for treatment
- Danger of infection due to pathogenic germs settling in nutrient-rich ('unhygienic') zones

**Electrical hazards include:**

- Disturbance of muscular functions (above all the heart muscle)
- Body tissue burns
- Electrolytic degradation of body tissue

**Fire and explosion hazards include:**

- Flammable/highly flammable substances (e.g. biogas, liquid gas, ammonia, hydrogen sulphide, heating fuel, flammable wastes)
- Explosion-endangered atmospheres

**Physical hazards include:**

- Noise (e.g. machine noise, impact noise due to moving wastes)
- Vibrations (transmission of machine movements to e.g. work platforms)
- Radiation (e.g. due to arc welding or measuring instruments)
- Ultrasound (e.g. due to measuring instruments)

**Suffocating or drowning hazard:**

- Methane and carbon dioxide are not toxic, but can result in death due to suffocation (oxygen deficiency).
- In the case of falling into a tank filled with liquid medium an acute danger of drowning exists, as even trained swimmers cannot remain above the water level in view of the high concentration of solid materials or high rate of air intake.

**Thermal hazards include:**



- Hot surfaces (e.g. in the heating system, drier, flare or CHP)
- Cold surfaces (e.g. metal surfaces of freestanding plant units during heavy frost)

**Residual stored energy hazards include:**

- Electrical energy
- Pressure (hydraulic, pneumatic, hydrostatic)
- Mechanical tension
- Kinetic energy (energy of motion)

**Special snow and ice hazards include:**

- Slipping hazard
- Snow and ice loading of buildings and plant components
- Falling snow and ice
- Freezing of system components (e.g. hydrostatic min/max pressure relief valve, pipes, fittings)
- Inhibited access due to snow masses (emergency escape and rescue ways; plant components)

**General hazards include:**

- Climatic conditions at the workplace (such as extreme temperatures or humidity)
- Insufficient lighting
- Physical stress (e.g. due to not ergonomically designed workplaces)
- Psychic stress
- Mechanical stress due to earthquakes

**Residual risk**

Safety measures can be implemented only against predictable hazards. The risk assessment serves for the analysis of these.

For the case that unexpected hazards occur (e.g. due to a near miss), the system operator must repeat the risk assessment and accordingly supplement this to include appropriate protective measures.

Hazards with a very low probability of occurrence (e.g. a meteorite impact) can, as a rule, not be excluded by meaningful protective measures. Safety-relevant components, such as overpressure protection, can be installed with very high failsafe performance and/or redundantly. Statistically, however, a very low residual probability remains for the case that all safety systems simultaneously fail. This residual risk can be further minimised with great technical effort and expenses, but can never be altogether eliminated.

**The greatest residual risk is in respect of human behaviour.** If workers do not observe the specified rules for behaviour and/or deactivated technical safety measures, there is no possibility to prevent the hazard that results.

### 1.3. Information and instructions to the staff

#### 1.3.1. Organisational protective measures

In accordance with the valid regulations for Occupational Safety and Health in the European Union <sup>1</sup> it is the responsibility of the employer to instruct the operators in safety and health protection on the job, in particular concerning the hazards relating to their specific duties and the measures for minimising these hazards. This instruction must be repeated as necessary, at least once per year and documented. Furthermore, the employer is responsible for instructing the operators in the contents of the valid accident prevention regulations and workers' insurance regulations, as well as the valid national rules and regulations in an understandable manner.

In order to fulfil this requirement, the duties, authorities and responsibilities of each worker must be precisely defined. This in turn defines the required scope of instruction and training. For the worker, this means that he may not perform a job to which he is not assigned. For the case that the range of duties of a worker is expanded, instruction must be repeated or accordingly supplemented.

Superiors must view occupational safety and health protection as an integrative part of their work. They must monitor compliance with safety measures and rules for behaviour by their workers and consider this in their performance evaluation.

The work flow must be organised so that the workers are not placed under such intensive **pressure of time** that they feel it is necessary to ignore safety measures.

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<sup>1</sup> COUNCIL DIRECTIVE of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work (89/391/EEC)

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Maintenance **and cleaning plans** must be defined and observed in accordance with the information of the manufacturer.

### **1.3.2. Personal protective equipment**

Personal protective equipment (PPE) serves to protect against hazards which cannot be excluded by technical or organisational measures. The employer is obligated to make the required protective equipment available to his workers in sufficient numbers and free of costs.

Instruction in the use of personal protective equipment intended to protect against fatal dangers or permanent health damage must take place.

### **1.3.3. Pictograms**

Important instructions and rules of behaviour both at the installation site and in the O&M manual shall be given with the help of pictograms to describe and to avoid hazards and for the protection of employees and equipment.

### **1.3.4. General rules for behavior**

General rules for behaviour have to be described in the O&M manual for the plant and shall be part of the regular instructions.

General rules are described in the following:

- Carry out work only when your supervisor has assigned you to do so and you have been specially instructed for this task.
- Enter explosion-endangered areas only when you have been specially instructed and assigned this task.
- Before beginning work, perform a visual inspection of the machines, tools, equipment, etc. to be used. Use these only when they are in a technically orderly and flawless condition.

- Use only tools suited for the work to be performed (use of the tools as intended). Following completion of the work, remove all tools and control them in respect of completeness.
- Follow the safety notes in the respective O&M manual. Use the specified personal protective equipment.
- Refrain from all tasks that you consider unsafe. Report recognised hazards for which the safety measures are not sufficient to your superior. Immediately report accidents - including near misses - to your superior.
- Never remove safety devices or render these inactive without introducing other measures against the existing hazards.
- Never climb onto or over railings which are e.g. intended to protect against falling or shield machines.
- Working under suspended loads is prohibited.
- For working on a machine, first switch this off and secure verifiably against switching on again.
- Never reach into moving parts of running systems.
- Transporting persons on conveyor belts or other transport equipment is forbidden.
- Avoid contact with working materials, such as wastes, substrate or auxiliary materials, such as machine oils, as well as possible.
- Ensure orderliness and cleanliness at your workplace and on the entire plant.
- Eating, drinking and smoking, as well as the storage of food, are not permitted outside the sanitary and social rooms provided for this purpose.
- The removal of objects from waste for private purposes is not permitted.
- Carry along a gas warning device in areas in which a dangerous atmosphere can form.
- Cleaning or drying of clothing, protective equipment or parts of the body with compressed air is forbidden.
- The use of mobile phones is prohibited in some areas resp. parts of the plant.

### 1.3.5. Hygiene

#### *Biological working materials and their assimilation paths*

The waste treated in the mechanical-biological waste treatment plant can contain micro-organisms capable of causing **infections**, **sensitising effects** or **toxic effects** in human beings. As the composition of the waste is not precisely known, the type, concentration and composition of the micro-organisms occurring are also not known in detail. A wide variety of **bacteria**, **fungi**, **parasites**, **protista**, **prions** and **viruses** can occur in the waste. The concentrations of the different micro-organisms can vary greatly with the ambient conditions (e.g. summer/winter) or with differences in the process conditions.

The release of these micro-organisms during waste treatment leads to the danger of diseases contracted by the operating personnel.

A health hazard due to micro-organisms exists only when these are assimilated by the body.

#### *Organisational hygiene instructions*

The operating personnel and also persons from external companies working on the plant must be **instructed** in advance concerning the special hygienic conditions to be considered on the waste treatment plant. No one should remain longer than necessary in the work areas in which a particularly high danger due to biological working materials is to be expected. The personnel are expected to observe sufficient personal hygiene and in this way exclude danger due to contact with micro-organisms.

The effectiveness of safety equipment and also ventilation systems must be controlled in accordance with the **maintenance and cleaning plan**.

## 1.4. Technical and organisational protective measures

### 1.4.1. Technical protective measures

In order to minimise hazards on the system, as far as possible and meaningful technical protective measures have to be implemented in accordance with the risk assessment which have to be undertaken by the manufacturers. These include, for example, process monitoring measures, such as limit switches or overfilling protection, measures for

maintenance work, such as repair switches, and structural measures, such as control platforms and railings.

It is essential that all equipment serving for technical protective measures be maintained in flawless condition. These measures may be deactivated or removed only when replaced by other, equally effective protective measures.

#### **1.4.2. Safety-relevant alarms**

Before the system reaches dangerous states of operation, safety shut-downs will be initiated by the *Supervisory Control and Data Acquisition (SCADA)* system. In the visualisation of the SCADA system, corresponding alarms or fault messages will then be issued.

In addition, visual or acoustic signallers have to be installed at least for the following system parts:

- Gas booster unit
- Chemical storage
- Container loading and unloading points

#### **1.4.3. Safety Devices**

The plant will be equipped with different safety devices e. g.:

- protection against overfilling of a tank or vessel
- temperature, spark and flame detectors to provide protection against fire and explosion hazards
- safety guard switches to provide protection of the operating personnel
- pressure limit switches

The hardwired/soft wired connection of all safety devices will be carried out through a fail-safe PLC system.

#### **1.4.4. Ventilation system**

Effective and suitable provision shall be made to ensure every enclosed workplace is supplied with sufficient quantity of fresh or purified air.

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All locations must be assessed for the potential of causing odour nuisance and controls specified.

The MBT plant will be controlled and monitored by a SCADA system, so that **no permanent workplaces** will exist in biological material hazard areas. For short-term activities in these areas, suitable personal protective equipment must therefore be worn.

In the mechanical pre-treatment and wet pre-treatment areas, stressing due to bio-aerosols is minimised by the targeted suction removal of bio-aerosol sources and the exhaust system for the hall as a whole. The effectiveness of the **ventilation system** must be controlled in regular intervals by the operator.

From the wet processing on, the substrate (waste-water suspension) will be led and stored by means of closed pipes and tanks, largely excluding contamination of the workplaces during regular operation.

The separation of the work areas from the sanitary and social areas, with the corresponding possibilities for cleaning and the separate keeping of work clothing and street clothing, is also important.

#### **1.4.5. Traffic routes and parking**

Organisation, signage and monitoring of traffic routes shall be so that pedestrians can walk to their place of work from the parking location without special work wear. Where this is impractical, the special work wear must be provided and worn.

Adequate separation of pedestrians and vehicle movements is important.

All locations where moving vehicles and pedestrian interface is unavoidable, suitable barriers must be erected to prevent the pedestrian from walking into the path of an oncoming vehicle or item of plant. Suitable signage will be erected to warn both vehicle/plant operative and pedestrians where this is likely to occur.

Adequate provision of properly maintained car parking for all members of staff / visitors that requires such parking that is secure and will allow other vehicles to move around without causing danger.

Adequate provision of traffic flow routes that allows the movement of vehicles to and from workshops.

Adequate provision for emergency exit route from offices and other facilities to a designated assembly location.

#### **1.4.6. Storerooms and material storage**

All storerooms must be designed to ensure ease of movement into and out of for the items that it is intended to store.

All aspects on good manual handling must be considered when designing storage racks.

Guardrails and other item restraints must be included in the specification to prevent items or persons from falling when manoeuvring the items stored.

#### **1.4.7. Manhole and roof covers**

All manholes and covers must be constructed to support the heaviest weight perceived for that location.

Where the manhole or cover is not considered a weight-bearing item, then it must be specified and identified with warning signage.

#### **1.4.8. Fixed Ladders and Access/Egress**

Vertical ladders must not be used as a primary access and egress for normal daily activities, unless it is physically impossible to otherwise provide.

Fixed ladders must be provided in pits, tanks and similar structures into which persons descend.

Where a fixed vertical ladder has been installed, on no account must it provide access onto a raised walkway by a person walking straight forward. Such a provision does not offer sufficient handholds to the person climbing up or attempting to descend. The steps of the ladder must be extended above the raised walkway to provide extra handhold facilities to those climbing or descending. A landing point level with the raised platform must be provided to either left or right.

A swing guardrail must protect all landing points.

A landing point must be provided for every 6meters lift, and must protrude at least 110cm above any landing it serves.

All fixed ladders of less than 15° to the vertical, and are more than 2,5meters high, must be fitted with safety hoops or permanently fixed fall arrest systems.



## Annex:

### Example for Operational risk assessment

#### Section 1 - General Operations

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
1	Initial entry into plant at start of shift	Vehicle movements	Operational Personnel	2	1	2	Recognised pedestrian routes into building and to work stations.  Follow signs.	Yes
2	Initial entry into plant at start of shift	CO present within building	Operational Personnel	4	1	4	CO indicator local to each entry point.	Yes
3	Unauthorised access	Potential injury to unauthorised personnel	Any Person	2	1	2	Doors to be kept closed during normal operation.  Security at site entrance.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
4	Walking personnel on site	Slips, trips and falls	Operational Personnel	2	2	4	Point out during induction / training.	Yes
5	Entry into plant	Fire in MBT Area	Operational Personnel	4	1	4	Acoustic and visual indication of fire.	Yes
6	Entry into plant	Noise emissions	Operational Personnel	2	3	6	Induct personnel to use PPE.  Warning signs.  Ensure relevant PPE is worn.	Yes

**Section 2 – Waste Reception Hall**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
1	Vehicle delivery	Vehicle reversing into building	Operational Personnel	2	2	4	Banks man / Weighbridge clerk and supervision during waste delivery.	Yes
2	Waste delivery	Potential injury due to debris	Operational Personnel	2	1	2	Ensure relevant PPE is worn.  Point out during induction / training.	Yes
3	Waste delivery	Noise emission	Operational Personnel	3	1	3	Ensure relevant PPE is worn.  Point out during induction / training.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
4	Waste delivery	Potential multiple vehicles, possible collisions	Operational Personnel	2	2	4	Traffic management plan for site to be followed.	Yes
5	Hydraulic or mechanical failure	Potential spillages	Operational Personnel	1	1	1	Spills procedure to be followed.	Yes
6	Walking personnel in Tipping Hall	Slips, trips and falls from debris	Operational Personnel	2	2	4	Ensure relevant PPE is worn.  Follow Site housekeeping instructions.	Yes
7	Shuffling and sorting waste in Tipping Hall by mechanical means	Potential injury due plant operation	Operational Personnel	3	1	3	Traffic management plan for Tipping Hall to be followed.  Point out during induction / training.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
8	Tipping Hall roller shutter door operations	Crush by roller shutter door	Operational Personnel	2	1	2	Safety devices.  Point out during induction / training.  Warning signs.	Yes
9	Vehicles exiting Tipping hall	Damage to roller shutter doors or other equipment	Operational Personnel	3	1	3	Door to be fully open.  Warning signs.  Point out during induction / training.	Yes

**Section 3 – Loading Into Shredder Operations**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
1	Vehicle delivery	Vehicle reversing into building	Operational Personnel	2	2	4	Banks man and supervision during waste delivery.	Yes
2	Waste delivery	Potential injury due to debris	Operational Personnel	2	1	2	Ensure relevant PPE is worn.	Yes
3	Waste delivery	Noise emission	Operational Personnel	3	1	3	Ensure relevant PPE is worn.  Point out during induction / training.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
4	Waste delivery	Potential multiple vehicles, possible collision	Operational Personnel	2	2	4	Traffic management plan for site to be followed.	Yes
5	Hydraulic or mechanical failure	Potential spillages	Operational Personnel	1	1	1	Spills procedure to be followed	Yes
6	Feeding waste into Pre-shredder by mechanical means	Potential injury due plant operation	Operational Personnel	3	1	3	Traffic management plan for Tipping Hall to be followed.  Point out during induction / training.	Yes
7	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	Training and induction of personnel according to O&M Manual and SOP's	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
8	Out of spec material fed into Pre-treatment	Potential spillages & damage to equipment	Operational Personnel	2	2	4	Pre-sorting of material. Training of personnel.	Yes



**Section 4 – Exhaust Air Treatment**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
1	Residues from Ductwork	Slips, trips and falls	Operational Personnel	2	1	2	Follow Site housekeeping instructions.  Training and induction of personnel according to O&M Manual.	Yes
2	Walking on platforms, stairways and vertical ladders	Slips, trips and falls	Operational Personnel	3	1	3	Use handrails. Point out during induction / training. Full edge protection on all stairways and platforms.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
3	Replacement of dust bags at filter	Dust emission	Operational Personnel	3	1	3	Ensure relevant PPE is worn.  Dust masks (FFP2) must be worn.  Training and induction of personnel according to O&M Manual.	Yes
4	Replacement of dust bags at filter	Manual handling	Operational Personnel	2	1	2	Ensure relevant PPE is worn.  Training and induction of personnel according to O&M Manual.  All staff trained in manual handling.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
5	Working close to Exhaust air treatment equipment	Noise emission	Operational Personnel	3	2	6	Sound insulation to meet Noise at work regulations.  Ensure relevant PPE is worn.  Point out during induction / training.	Yes
6	Access to equipment at height	Potential injury	Operational Personnel	4	1	4	Training and induction of personnel.  Work according to SOPs. Full edge protection on all stairways and platforms.	Yes
7	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	Training and induction of personnel according to O&M Manual and SOP's	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
8	Working in Confined Space	Potential injury	Operational Personnel	3	1	3	Point out during induction / training.  Ensure relevant PPE is worn.  Permit issued.	Yes
9	High concentration of dust could lead to explosion	Potential injury	Operational Personnel	4	1	4	Follow Site housekeeping instructions.  Training and induction of personnel according to O&M Manual. Warning signs. Prohibited usage of potentially explosive equipment. Explosion protection devices fitted to dust filters.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
10	Working in MPT Hall	Odour emission	Operational Personnel	2	2	4	Ensure relevant PPE is worn. Point out during induction / training. Odour-control system installed in building.	Yes

**Section 5 – Mechanical Pre-Treatment Hall**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
1	Debris from machine equipment	Slips, trips and falls	Operational Personnel	2	2	4	Follow Site housekeeping instructions.  Training and induction of personnel according to O&M Manual.  Ensure relevant PPE is worn.	Yes
2	Walking on platforms, stairways and vertical ladders	Slips, trips and falls	Operational Personnel	3	1	3	Use handrails.  Point out during induction / training.  Full edge protection on all stairways and platforms.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
3	Working near Ferrous separators	Potential injury	Operational Personnel	4	1	4	Point out during induction / training (especially point out potential damage to magnetic cards, mobile phones etc.)  Warning signs.  Control of employment of personnel wearing heart pace makers.	Yes
4	Working close to MPT equipment	Noise emission	Operational Personnel	3	2	6	Ensure relevant PPE is worn.  Point out during induction / training.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
5	Access to equipment at height	Potential injury	Operational Personnel	4	1	4	<p>Training and induction of personnel.</p> <p>Work according to SOPs.</p> <p>Full edge protection on all stairways and platforms.</p>	Yes
6	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	<p>Training and induction of personnel according to O&amp;M Manual and SOP`s</p>	Yes
7	Working in confined space	Potential injury	Operational Personnel	3	1	3	<p>Point out during induction / training.</p> <p>Ensure relevant PPE is worn.</p> <p>Permit issued.</p>	Yes



Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
8	Working in MPT Hall	Odour emission	Operational Personnel	2	2	4	Ensure relevant PPE is worn.  Point out during induction /training.  Odour-control system installed in building.	Yes

**Section 6 – Wet Pre-Treatment Hall**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
1	Debris from machine equipment	Slips, trips and falls	Operational Personnel	2	2	4	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Ensure relevant PPE is worn.</p>	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
2	Spillage on floor	Slips, trips and falls	Operational Personnel	2	3	6	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Ensure relevant PPE is worn.</p>	Yes
3	Walking on platforms, stairways and vertical ladders	Slips, trips and falls	Operational Personnel	3	1	3	<p>Use handrails.</p> <p>Point out during induction / training.</p> <p>Full edge protection on all stairways and platforms.</p>	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
4	Walking near pump sump	Slips, trips and falls	Operational Personnel	3	1	3	Use handrails.  Point out during induction / training.  Warning signs.	Yes
5	Working close to machine equipment	Noise emission	Operational Personnel	3	2	6	Ensure relevant PPE is worn.  Point out during induction / training.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
6	Access to equipment at height	Potential injury	Operational Personnel	4	1	4	Training and induction of personnel.  Work according to SOPs.  Full edge protection on all stairways and platforms.	Yes
7	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	Training and induction of personnel according to O&M Manual and SOP's	Yes
8	Working in confined space	Potential injury	Operational Personnel	3	1	3	Point out during induction / training.  Ensure relevant PPE is worn.  Permit issued.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
9	Working in WPT Hall	Odour emission	Operational Personnel	2	2	4	Ensure relevant PPE is worn.  Point out during induction / training.  Odour-control system installed in building.	Yes

**Section 7 – Chemical Storage Area**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
1	Storage of chemicals	Potential injury due to contamination	Operational Personnel	4	1	4	Point out during induction / training.  Warning signs. Ensure relevant PPE is worn. Provision of Eye Flush & Safety Shower.COSHH assessments.	Yes
2	Spillage on floor	Slips, trips and falls	Operational Personnel	2	1	2	Follow Site housekeeping instructions.  Training and induction of personnel according to O&M Manual.  Ensure relevant PPE is worn.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
3	Walking on platforms, stairways and vertical ladders	Slips, trips and falls	Operational Personnel	3	1	3	Use handrails. Point out during induction / training. Full edge protection on all stairways and platforms.	Yes
4	Working close to pumps	Noise emission	Operational Personnel	3	1	3	Ensure relevant PPE is worn. Point out during induction / training.	Yes
5	Access to equipment at height	Potential injury	Operational Personnel	4	1	4	Training and induction of personnel.  Work according to SOPs. Full edge protection on all stairways and platforms.	Yes
6	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	Training and induction of personnel according to O&M Manual and SOP`s	Yes



Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
7	Working in confined space	Potential injury	Operational Personnel	3	1	3	Point out during induction / training.  Ensure relevant PPE is worn.  Permit issued.	Yes
8	Concentrate drawing-off	Potential injury Environmental incident	Operational Personnel	3	1	3	Warning signs. Training and induction of personnel according to O&M Manual.  Ensure relevant PPE is worn. Provision of three-way valve and blind tank.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
9	Chemicals dosing and filling at Chemical station	Potential injury / Environmental incident	Operational Personnel Environment	3	2	6	Warning signs. Training and induction of personnel according to O&M Manual.  Ensure relevant PPE is worn. Provision of three-way valve and blind tank.	Yes
10	Blind tank drawing-off	Acid contamination could lead to potential injury or Environmental incident	Operational Personnel Environment	3	1	3	Warning signs.  Training and induction of personnel according to O&M Manual. Ensure relevant PPE is worn. Provision of three-way valve and blind tank.	Yes

**Section 8 –Dewatering Area**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
1	Heat emissions from equipment	Potential injury	Operational Personnel	3	1	3	Warning signs.  Training and induction of personnel according to O&M Manual.  Ensure relevant PPE is worn.	Yes
2	Spillage on floor	Slips, trips and falls	Operational Personnel	2	1	2	Follow Site housekeeping instructions.  Training and induction of personnel according to O&M Manual.  Ensure relevant PPE is worn.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
3	Walking on platforms, stairways and vertical ladders	Slips, trips and falls	Operational Personnel	3	1	3	Use handrails. Point out during induction / training. Full edge protection on all stairways and platforms.	Yes
4	Open rotating equipment	Potential injury	Operational Personnel	3	1	3	Warning signs.  Point out during induction / training.  Training and induction of personnel according to O&M Manual.	Yes
5	Working close to machine equipment	Noise emission	Operational Personnel	3	2	6	Ensure relevant PPE is worn.  Point out during induction / training.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
6	Access to equipment at height	Potential injury	Operational Personnel	4	1	4	Training and induction of personnel.  Work according to SOPs.  Full edge protection on all stairways and platforms.	Yes
7	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	Training and induction of personnel according to O&M Manual and SOP`s	Yes
8	Working in confined space	Potential injury	Operational Personnel	3	1	3	Point out during induction / training.  Ensure relevant PPE is worn.  Permit issued.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled?
9								Yes
10	Chemicals (Anti-foaming & Flocculation liquid)	Slips, trips and falls	Operational Personnel	3	2	6	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Ensure relevant PPE is worn.</p> <p>Warning signs.</p>	Yes
11	Residues from ductwork	Slips, trips and falls	Operational Personnel	2	1	2	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p>	Yes

**Section 9 – CHP Area**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
1	Heat emissions from equipment	Potential injury	Operational Personnel	3	1	3	Warning signs. Training and induction of personnel according to O&M Manual.  Ensure relevant PPE is worn.	Yes
2	Spillage on floor	Slips, trips and falls	Operational Personnel	2	1	2	Follow Site housekeeping instructions.  Training and induction of personnel according to O&M Manual.  Ensure relevant PPE is worn.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
3	Walking on platforms, stairways and vertical ladders	Slips, trips and falls	Operational Personnel	3	1	3	Use handrails. Point out during induction / training. Full edge protection on all stairways and platforms.	Yes
4	Walking near Transformers	Potential injury	Operational Personnel	4	1	4	Warning signs.  Point out during induction / training.  Transformer fences to be kept locked.  Authorised personnel access.	Yes



Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
5	Working close to machine equipment	Noise emission	Operational Personnel	3	1	3	Ensure relevant PPE is worn.  Point out during induction / training.	Yes
6	Access to equipment at height	Potential injury	Operational Personnel	4	1	4	Training and induction of personnel.  Work according to SOPs. Full edge protection on all stairways and platforms.	Yes
7	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	Training and induction of personnel according to O&M Manual and SOP`s	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
8	Working in confined space	Potential injury	Operational Personnel	3	1	3	Point out during induction / training.  Ensure relevant PPE is worn.  Permit issued.	Yes
9	Natural gas emission could lead to fire	Potential injury	Operational Personnel	4	1	4	Warning signs.  Point out during induction / training.  Training and induction of personnel according to O&M Manual.  Fire isolation valves on gas main.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
10	Biogas emission could lead to fire	Potential injury	Operational Personnel	4	1	4	Warning signs.  Point out during induction / training.  Training and induction of personnel according to O&M Manual.  Safety isolation valves on upstream equipment.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
11	Chemicals (Glycol liquid)	Slips, trips and falls	Operational Personnel	3	1	3	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Ensure relevant PPE is worn.</p> <p>Warning signs.</p> <p>COSHH assessments.</p>	Yes
12	Residues from ductwork	Slips, trips and falls	Operational Personnel	2	1	2	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p>	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
13	Replacement of dust bags inside the filter	Dust emission	Operational Personnel	3	1	3	Ensure relevant PPE is worn.  Dust masks (FFP2) must be worn.  Training and induction of personnel according to O&M Manual.	Yes
14	Replacement of dust bags at filter	Manual handling	Operational Personnel	2	1	2	Ensure relevant PPE is worn.  Training and induction of personnel according to O&M Manual.  All staff trained in manual handling.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
15	Uncontrolled discharge of dust bags inside filters could lead to explosion	Potential injury	Operational Personnel	4	1	4	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Ensure relevant PPE is worn.</p> <p>Regular Service of Explosion and fire suppression.</p>	Yes

**Section 10 – Biological Tank Area**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
1	Incorrect handling of equipment could lead to explosion	Potential injury	Operational Personnel	4	1	4	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Warning signs.</p> <p>Prohibited usage of potentially explosive equipment.</p> <p>Restricted access to bund wall area.</p>	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
2	Spillage on floor	Slips, trips and falls	Operational Personnel	2	1	2	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Ensure relevant PPE is worn.</p>	Yes
3	Walking on platforms, stairways and vertical ladders	Slips, trips and falls	Operational Personnel	3	1	3	<p>Use handrails.</p> <p>Point out during induction / training.</p> <p>Full edge protection on all stairways and platforms.</p>	Yes



Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
4	Walking near Gas storage	Potential injury	Operational Personnel	4	1	4	Warning signs.  Point out during induction / training.  Gas storage fences to be kept locked.  Restricted access.	Yes
5	Working close to machine equipment	Noise emission	Operational Personnel	3	1	3	Ensure relevant PPE is worn.  Point out during induction / training.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
6	Access to equipment at height	Potential injury	Operational Personnel	4	1	4	Training and induction of personnel.  Work according to SOPs.  Full edge protection on all stairways and platforms.	Yes
7	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	Training and induction of personnel according to O&M Manual and SOP`s	Yes
8	Working in confined space	Potential injury	Operational Personnel	3	1	3	Point out during induction / training.  Ensure relevant PPE is worn.  Permit issued.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
9	Biogas emission could lead to fire	Potential injury	Operational Personnel	4	1	4	Warning signs.  Point out during induction / training.  Training and induction of personnel according to O&M Manual.  Restricted access.	Yes
10	Chemicals	Potential injury	Operational Personnel	3	1	3	Follow Site housekeeping instructions.  Training and induction of personnel according to O&M Manual.  Ensure relevant PPE is worn.  Warning signs.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
11	Residues from ductwork	Slips, trips and falls	Operational Personnel	2	1	2	Follow Site housekeeping instructions.  Training and induction of personnel according to O&M Manual.	Yes
12	Enclosed bund provided	Pumping potentially contaminated liquid to drainage system.	Environmental risk	3	1	3	Operational procedure to be followed.  Training and induction of personnel.	Yes

**Section 11 – Assorted Fraction Removal**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
1	Forklift movements	Potential injury	Operational Personnel	2	2	4	Traffic management plan for Fraction removal area to be followed.  Point out during induction / training.	Yes
2	Container removal	Potential injury due to debris	Operational Personnel	2	1	2	Traffic management plan for Fraction removal area to be followed.  Point out during induction / training.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
3	Working close to machine equipment at Fraction removal area	Noise emission	Operational Personnel	2	2	4	Ensure relevant PPE is worn.  Point out during induction / training.  Warning signs.	Yes
4	Forklift movements	Potential multiple vehicles, possible collision	Operational Personnel	2	1	2	Traffic management plan for site to be followed.	Yes
5	Hydraulic or mechanical failure	Potential spillages	Operational Personnel	1	1	1	Spills procedure to be followed	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
6	Walking personnel in Fraction removal area	Slips, trips and falls from debris	Operational Personnel	2	1	2	Ensure relevant PPE is worn.  Follow Site housekeeping instructions.	Yes
7	Loading and unloading container bays	Potential injury due to multiple reasons	Operational Personnel	3	2	6	Traffic management plan for Fraction removal area to be followed.  Point out during induction / training.	Yes
8	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	Training and induction of personnel according to O&M Manual and SOP's	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
9	Walking on platforms, stairways and vertical ladders	Slips, trips and falls	Operational Personnel	3	1	3	Use handrails.  Point out during induction / training.  Full edge protection on all stairways and platforms.	Yes
10	Access to equipment at height	Potential injury	Operational Personnel	4	1	4	Training and induction of personnel.  Work according to SOPs.  Full edge protection on all stairways and platforms.	Yes



Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
11	Spillage on floor	Slips, trips and falls	Operational Personnel	2	1	2	<p>Follow Site housekeeping instructions.</p> <p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Ensure relevant PPE is worn.</p>	Yes
12	Moving conveyors	Potential injury	Operational Personnel	3	2	6	<p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Warning signs.</p> <p>Point out during induction / training.</p>	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
13	Moving containers	Potential injury	Operational Personnel	3	2	6	<p>Training and induction of personnel according to O&amp;M Manual.</p> <p>Warning signs.</p> <p>Point out during induction / training.</p> <p>Traffic management plan for Fraction removal area to be followed.</p>	Yes
14	Roller shutter door operations	Crush by roller shutter door	Operational Personnel	2	1	2	<p>Safety devices.</p> <p>Point out during induction / training.</p> <p>Warning signs.</p>	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
15	Vehicle/ container removal from loading point	Damage to roller shutter doors or other equipment	Operational Personnel	3	1	3	Door to be fully open.  Warning signs.  Point out during induction / training.	Yes
16								

**Section 12 – Fire / CO Detection**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
1	Fire	Injury to personnel	Operational Personnel	4	1	4	<p>Aspirating fire detection and sprinkler system.</p> <p>Manual call points provided and fire escape signage.</p> <p>Escape procedures detailed during induction / training.</p> <p>VWM emergency plan to be followed.</p>	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
2	Elevated levels of carbon monoxide within building	Potential injury	Operational Personnel	4	1	4	2 stage alarm provided and if second stage reached VWM emergency plan to be followed.  Escape procedures detailed during induction / training.	Yes
3	Sprinkler system not operational until constructed	Increased fire risk	Operational Personnel	3	1	3	Fire risk assessment to consider additional hazards.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
4	Extinguishing fire	Potential injury	Operational Personnel	2	1	2	Regular Service of extinguishers.  Use of extinguishers only by trained personnel.  Provision of suitable fire extinguishers.  VWM emergency plan to be followed.	Yes

**Section 13 – Miscellaneous Electrical Areas**

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
1	Entering MCC's	Potential injury	Operational Personnel	2	2	4	MCC room doors to be kept locked.  Training and induction of personnel.  Warning signs.  Ensure relevant PPE is worn.  Authorised Personnel access only.	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
2	Entering Transformer stations	Potential injury	Operational Personnel	4	1	4	Transformer fences to be kept locked.  Training and induction of personnel.  Warning signs.  Ensure relevant PPE is worn.  Authorised Personnel access only.	Yes
3	Incorrect operation and maintenance of equipment	Potential injury	Operational Personnel	3	1	3	Training and induction of personnel according to O&M Manual and SOP`s	Yes



Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
4	Electrical maintenance works	Potential injury	Operational Personnel	4	2	8	<p>Use of correct Tag out procedures for relevant equipment.</p> <p>Training and induction of personnel according to O&amp;M Manual and SOP`s.</p> <p>Ensure relevant PPE is worn.</p>	Yes

Ref. No.	Activity/Hazard	Associated Risk	Risk to	Severity	Likelihood	Risk Rating	Existing Control Measures	Risk Adequately Controlled ?
5	General control room operations	Potential injury	Operational Personnel	2	2	4	DSE assessment carried out.  PAT testing.  Training and induction of personnel according O&M Manual and SOP's  Forced ventilation and heating/ cooling.	Yes