

POPs stockpile Merkim site, Kocaeli, Turkey

**Detailed site survey/assessment, operational planning,
environment/safeguards assessment, training and
supporting technical supervision related to the removal of
POPs**

**Sub Task 3.4: Occupational Health and Safety Plan
Guidelines**

7 June 2017

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Sub Task 3.4: Occupational Health and Safety Plan Guidelines

Responsibility

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Project number	1239389
Number of pages	44 (excluding appendices)
Date	7 June 2017
Signature	This document was released with the explicit approval of authorized project management.

Colophon

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Reference R005-1239389GMC-beb-V03-NL

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1 Introduction

1.1 General

The objective of this task 3.4 is the preparation of Health & Safety Guidelines (further referred as HASP Guidelines). This HASP Guideline is intended as input for the preparation of contractor's tender documentation and the guideline for the successful contractor to prepare the contractor's HASP. The aim of this document and ultimately the contractor's HASP is to meet national and international regulatory and safeguards requirements to provide good and safe conditions during the clean-up of the POPs¹ stockpile and the other restoration works at Merkim site in Kocaeli, Turkey.

1.2 Location of the site

The Merkim site is located in the Sirintepe Region of Derince town in Kocaeli province, Western Turkey. Derince is a coastal town on the Northern shore of Izmit Bay. The official address of the site is: Deniz mah. Petrol Office at the street Derince in Kocaeli. The cadastral annotation is: Layout no: 73, Plot no: 50 and Parcel no: 34. The location of Merkim POPs stockpile site in Kocaeli, Turkey is shown in Figure 1.1.

Approximate height of the site is 4 - 5 m above sea level. The site itself is located in an oxbow of the entry road to an industrial zone. The area is relatively flat, slightly sloping towards Izmit bay which is located some 250 m to the South. The closest hills are some 2 km north of the site. Directly North of the site is the high speed railroad Istanbul - Eskisehir, to the West is a new Mosque for the workers of nearby industrial facilities and a restaurant for tanker truck drivers. To the South and the West of the site are Petrol Ofisi tank storage areas, to the East of the site is the Shell Derince Dolum Tesisi tank storage and Koruma Klor Alkali San. ve Tic A Ş chemical factory. The nearest settlement is Deniz (sea) hometown that is approximately 350 m to the northeast. The planning status of the site is Industrial Land; there are no land-use restrictions for the area.

¹ POPs are all those chemicals that have been identified in all applicable annexes of the Stockholm Convention on Persistent Organic Pollutants



Figure 1.1 Location of Merkim POPs stockpile site (Source: Google Maps, 19 January 2017)

The Merkim site is approximately 8,000 m² in size and consists of six interlinked warehouses surrounded by unpaved outer areas. The entire site is enclosed by a 3 m high barbed wire fence in good condition. As of 2016 there is one main entrance to the interlinked warehouses, all other entry points have been sealed off. The outside walls and doors, except the main entrance, of the warehouses are sealed with foam concrete to reduce odour nuisance in the surrounding.

Of the six interlinked warehouses (see figure 1.2). Four warehouses (no 3, 4, 5 and 6) have the same configuration (20 x 30 m) with a maximum ceiling height of 8.18 m. The two Northern most warehouses (no 1 and 2) are smaller in size. A small underground storage (presumably an old septic tank) is located outside the Warehouse 1c (see figure 1.2).

Inside the warehouses POPs wastes² are present in stockpiles, part of the POPs wastes are present in plastic packaging materials (PE bags, paper bags with plastic liners) and part of the POPs wastes have been repacked in metal open head drums mainly of 200 litres. The POPs wastes are stored under substandard conditions, the warehouses are leaking and the entire warehouse is covered in a layer of POPs dust. All warehouse floors have a layer of cemented POPs and are covered in POPs dust as well as the walls, the rafters of the roof construction, the concrete pillars of the building skeleton and all equipment and other materials present.

² POP wastes are all materials that have a POP-pesticides chemical and associated congener concentration above 5,000 ppm or 5,000 mg/kg dry matter for solids

Total quantity of POPs wastes is estimated at 2218 tons, the total quantity of POPs impacted materials³ is estimated at 556 tons, for exact quantities please refer to Task 2 Site Description Survey and Assessment Report (Tauw report R003-1239389GMC-beb-V02-NL, 23 January 2017).

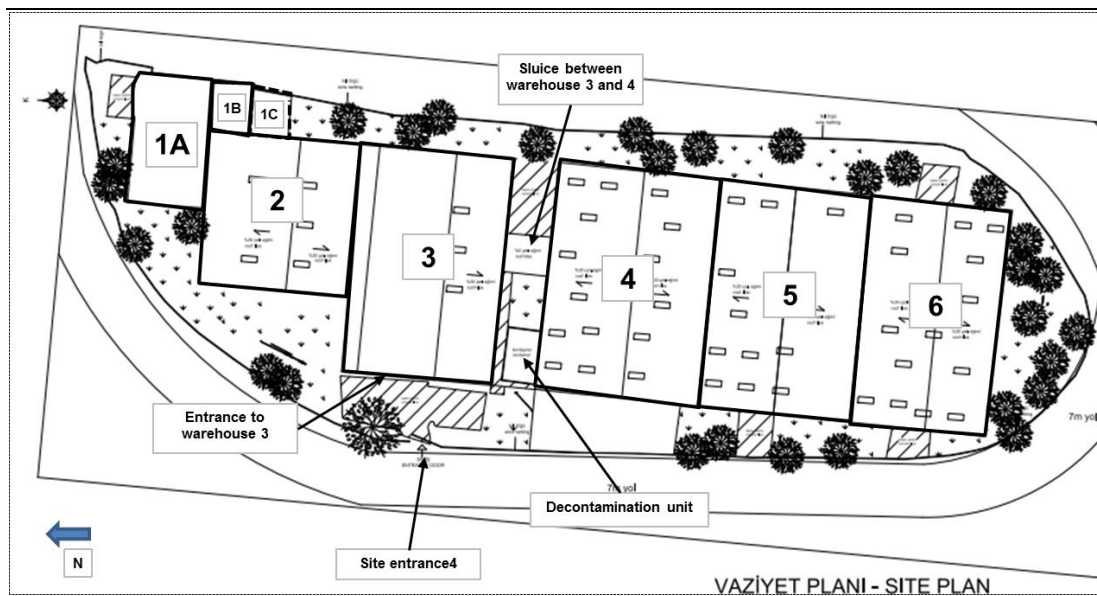


Figure 1.2 Site layout with indication of warehouse numbers and main site features

1.3 Contamination situation

POPs wastes

All materials inside the warehouses, as well as the concrete floors, the walls of warehouses and the soil underneath the floor are impacted by the long term storage of POPs wastes. Direct contact with materials in these parts of the site can potentially lead to exposure to high concentrations of POPs.

Representative POPs waste samples from the six different warehouses are analysed for α -HCH, β -HCH, γ -HCH, δ -HCH, 2,4'-DDT, 4,4'-DDT and 4,4'-DDD. According to the analytical results all pesticide products encountered inside the warehouses are POPs. In most cases it concerns HCH production wastes with a purity of approximately 40 % (i.e. 40 % of the material is POPs wastes, 60 % is inorganic mixture/filler).

³ POP impacted wastes are all materials, including site building materials, that have a POP-pesticides chemical and associated congener concentration between 50 and 5,000 ppm or 50 and 5,000 mg/kg dry matter or of which can reasonably be assumed that they contain concentrations between these mentioned values

Limited quantities of the POPs wastes are pesticides such as Technical HCH and DDT end products. Other materials inside the warehouses, machinery as well as the floors and the walls are covered in layers of POPs containing dusts. These materials should as such, from a health and safety perspective, be treated as if they are POPs wastes. Concentration of total POPs of the wall blocks varies between 90 and 539 mg/kg (as measure for entire blocks), concentrations of POPs in concrete floor top layer varies between 113 and 18,363 mg/kg. These concentrations were measured after the removal of superficial dust. Concentration of POPs in the on-site soil outside the warehouses on site is 0.3 - 1,747 mg/kg with concentrations of concern being largely localized near the current site entrance.

Asbestos

Each warehouse has a gable roof made out of asbestos corrugated sheeting mounted on steel rafters, the rafters are resting on reinforced concrete skeleton of the building. The roof consists of Asbestos cement corrugated sheets with 10 - 15 % of the material consisting of Chrysotile asbestos. Between Warehouse 3 and 4 is a narrow corridor made of asbestos sheets with a roof made out of corrugated iron sheeting.

Other contaminants of concern

Samples of the soil directly underneath the warehouse floors contained high concentrations of Total Petrol Hydrocarbons (mineral oil) and to a lesser extent chrome. However as no works are envisaged underneath the warehouse floors and these floors will be left in place after finalization of the works, as containment measure. Subsurface contamination will be subject to further evaluation and action by the site owner after completion of the works covered herein.

1.4 Project Scope

The operational work plan (Task 3.2, report R004-1239389GMC-V01) was used as the input to establish the scope of works. For the removal of POPs wastes and POPs impacted wastes, site clean-up and restoration consist of the following activities:

1. Preparation of the site including the installation of site zoning and implementation of cross-contamination prevention measures
2. Repacking of POPs wastes into approved packaging materials for off-site transport
3. Separation, processing and packing of materials impacted by the storage of POPs wastes for off-site transport
4. Removing and packing of POPs contaminated top layers of the warehouse floors and demolition and packing of POPs contaminated parts of the warehouse wall the for off-site transport

5. Loading and off-site transport of POPs wastes, POPs impacted materials and demolition wastes and clean demolition waste
6. Demolition and loading in containers of remaining clean warehouse/building structures for off-site transport

The current Occupational Health and Safety Plan Guidelines are a holistic approach to the project and are intended to cover the complete clean-up and final demolition of the Merkim warehouses. The factual implementation of the clean-up and demolition will be split in a number of separate contracts which will be executed either directly by the site owner or under GEF administered contracts.

1.5 Health & Safety Plan Guidelines

This HASP Guideline document is a reference document that contractors can refer to, during the preparation of his bid, regarding the health and safety monitoring and mitigation measures that are envisaged for the execution of the work on the Merkim site. In addition it serves as a guideline for the HASP that the Contractor will prepare prior to execution of the works. This HASP guideline includes the envisaged occupational health and safety measures, emergency response requirements and procedures and contains the following sections:

- **Section 2 Involved parties:** This section presents parties involved in this project such as the contracting party, the engineering companies, the project management, the health and safety expert of the engineering company, the contractor and the health and safety expert of the contractor
- **Section 3 Risk Assessment:** This section includes all risks that can arise from the on-site works and activities in the direct surrounding of the warehouse during each project phase as identified during the design phase. The risk assessment is for advisory and future contracting support only. The contractor is expected to draft a final risk assessment based on his/her execution work plan. These identified risks are presented in tables that give: related activities which cause a risk; the potential risk; the possible consequences and the suggestions for risk control / mitigation measures. In addition, a more detailed table is presented as an Annex 1 to this document and this Annex 1 includes possible hazard, consequences, affected parties, actions, necessary precautions and also risk assessment scoring with Fine & Kinney Method. This method gives a total risk score assessed by the multiplication of the given values or probability that the risk realizes, frequency of exposure to the risk and gravity of the risk when realized

- **Section 4 Health and safety requirements:** This section provides an overview of the specific Health and Safety (H&S) requirements that includes execution requirements, hazard identification and risk management to be implemented by the contractor for each phase of the work. This section also defines site safety zoning for the various stages of the operation, designation for cleaning, intermediate and contaminated areas, prescriptions for using Personal Protective Equipment (PPE), and other support facilities such as loading points and analytical support
- **Section 5 Site safety and security:** This section describes the H&S system, H&S plans and procedures of the contractor, and working practices which are applicable to the activities performed at each Work Area. This section has subsections of Near Misses, Incidents and Emergency Management and Response, H&S Performance Reporting, Inspections, Auditing, and Review, Inspection and Audit Findings

2 Involved Parties

The different parties with contact details involved in the overall Merkim site project should be listed in this section of the HASP Guidelines. Involved parties and their roles in the project can vary for the different contracts/work components.

This list is not complete and only reflects the author's understanding but provides general guidance on information a contractor should include when preparing the Contractor HASP. The roles and responsibilities of the different listed stakeholders are also summarized in the subsections below.

2.1 Contracting party

Name :
Contact person :
Zip code/town :
Phone number :
Role : Overall project management and supervision
Responsibilities : The contracting and the contracting party's obligation from the contract

2.2 Site Assessment and Operational Planning Engineering

Name :
Contact person :
Address :
Zip code/town :
Phone number :
Role : Technical inputs into tender documents
Responsibilities : Technical inputs are up to the contracting party's desired standards

2.3 Training and operational technical supervision (Contracting Party's Representative)

Name :
Contact person :
Address :
Zip code/town :
Phone number :

Role : Daily supervision and monitoring of the work
Responsibilities : Safe and environmental sound execution of the work in line with the contract between the contracting party and the contractor (s)

2.4 Health and Safety expert engineering

Name :
Contact person :
Address :
Zip code/town :
Phone number :
Role : Monitoring the health and safety performance of the clean-up of the POPs stockpile and the other restoration works
Responsibilities : Reporting contractor's health and safety performance and advising Contractor improving his health and safety performance

2.5 Health and Safety coordinator contractor

Name :
Contact person :
Address :
Zip code/town :
Phone number :
Role : Manage the health and safety performance of the clean-up of the POPs stockpile and the other restoration works
Responsibilities : Health and safety performance in accordance with Turkish By-Law on Occupational Health and Safety In Construction Works (05.10.2013-28786)

2.6 Occupational Safety Specialist (OSS)

Name :
Contact person :
Address :
Zip code/town :
Phone number :
Role and responsibilities : According to Turkish Law on Business Health and Safety No:6331

2.7 Workplace Physician (WPP)

Name :
Contact person :
Address :
Zip code/town :

Phone number :
Role : Health check-up of staff working at the site
Responsibilities : According to Turkish Law on Business Health and Safety No:6331

2.8 Contractor

Name :
Contact person :
Address :
Zip code/town :
Phone number :
Role : Carry out the clean-up of the POPs stockpile and the other restoration works
Responsibilities : Complete the work of the contract in a safe and environmentally friendly way

3 Risk assesment

3.1 General

In the following subsections the risks identified during the design phase are listed and suggested measures included. Annex 1 provides a ranking of the risks according to Fine & Kinney Method. According to Fine & Kinney Method, the risk assessment is done considering three parameters: the probability (P) of an accident or damage occurrence, the exposure at risk frequency (F) and the gravity (G) of the induced consequence. The risk assessment is for advisory and future contracting support only. Contractor should perform a new risk assessment with aforementioned method based on his final Execution Work Plan and include it in the Contractor HASP.

3.2 Risks surrounding land-use

The assessment of the risks resulting from the surrounding land-use with its possible cause, possible consequence and corresponding suggested mitigation measure are given in Table 3.1. A semi quantitative risk assessment for the same risks is given in Appendix 1. Appendix 1 gives risk scores by using Fine and Kinney Method. If certain risks are applicable during execution, the contractor should apply measures and develop management tools to take away, control or accept and monitor these risks.

Table 3.1 Risks resulting from the surrounding land-use

Subject	Possible risk cause	Possible consequence	Suggestion of measures
Traffic on surrounding roads	<ul style="list-style-type: none"> • Busy and narrow roads to get to the site • Inattention of truck and tanker drivers 	<ul style="list-style-type: none"> • Injury/casualty by accidents • Damages by accidents 	<ul style="list-style-type: none"> • Preparing <i>Traffic control plan</i> by contractor • Traffic measures at entrance and exit of the work area • Road warning signs
	<ul style="list-style-type: none"> • Inattention of staff crossing the road 	<ul style="list-style-type: none"> • Injury/casualty by accidents • Damages by accidents 	<ul style="list-style-type: none"> • Warning signs at site exit • Have traffic control or spotter at site exit and at road corners during entry of site with machinery / vehicles • Address issue at Toolbox meeting and the daily start work analyses
Location related traffic	<ul style="list-style-type: none"> • Inattention of drivers 	<ul style="list-style-type: none"> • Injury/casualty by accidents • Damages by accidents 	<ul style="list-style-type: none"> • Clear agreements with Organized Industrial Zone and Mosque

Subject	Possible risk cause	Possible consequence	Suggestion of measures
	<ul style="list-style-type: none"> No clear agreements with the Organized Industrial Zone 	<ul style="list-style-type: none"> Blocking roads for emergency actions, etc. 	<ul style="list-style-type: none"> Map and mark the road at the working area Alignment of working hours with the Mosque and periods of prayer Forbid parking on the road next to the site
Easy site access	Unauthorized persons access the site	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents Exposure to contaminants 	<ul style="list-style-type: none"> Fence off/mark site Closed site entrance unless site staff present next to entrance
Working in underground	<ul style="list-style-type: none"> No underground cables and/or pipes information at hand Careless work 	<ul style="list-style-type: none"> Injury/casualty by accidents, fire and explosion Damages by accidents Damages by fire and explosions Damages and exposure by spills 	<ul style="list-style-type: none"> Consult maps/drawings upfront Consult site owners/operators upfront Use detection equipment Digging pilot holes (by hand)
Working above ground	<ul style="list-style-type: none"> No above ground cables and/or pipes information at hand Careless work 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents Damages by fire, explosions Damages and exposure by spills 	<ul style="list-style-type: none"> Consult owner of the cables and/or pipes Consult maps/drawings upfront Consult site owners/operators upfront

3.3 Risks site activities

This subsection identifies and discusses the identified risks related to the working conditions expected on the basis of the design. The following working conditions are reviewed:

1. Site layout (see subsection 3.3.1)
2. Traffic entering and leaving the site (see subsection 3.3.2)
3. Hazardous wastes handling (see subsection 3.3.3)
4. Working on heights (see subsection 3.3.4)
5. Lifting and lowering (see subsection 3.3.5)
6. Demolition (see subsection 3.3.6)
7. Cleaning (see subsection 3.3.7)

3.3.1 Site layout

Site should remain fenced off and unauthorized people cannot enter the site. On the site, the contractor has limited space for the execution of all activities. Especially available and suitable space for storage of clean repackaging materials, equipment and repacked POPs wastes and POPs impacted wastes is limited. Before starting the work, *site layout* including site zoning at different stages of the works, should be established and agreed with the contracting party.

A communication system should be available in case of emergencies. As transfer between working zones is restricted, communication system in place allows for communication with and warn staff working in other zones of possible emergencies without having to enter the zone physically. Communication system has, in addition to audial warning, a visual warning as well.

An '*Emergency response plan* should be drafted' prior to the start of the works. This plan has describes the emergency procedures (obvious emergencies, precautions, repressive measures, emergency warning and possible evacuations). The plan includes a site layout map with the location of the first aid kit, fire extinguishers, eye washing bottles, emergency shower et cetera clearly marked.

3.3.2 Traffic entering and leaving the site

The Organized Industrial Zone, where the Merkim site is located, can be readily accessed with (large) equipment and lorries/trucks, but entering the site from the public road and leaving the site are difficult with a limited turning radius. Warning signs with '*CAUTION, Road works ahead 50 m*' should be installed around 50 meter from the entrance at the two sites of the road. Lorries/trucks entering and leaving the site should be assisted by at least two traffic supervisors. Each traffic supervisor controls the traffic at one site of the road during equipment, lorries/truck entering or leaving the site.

Clear arrangements should be made with the Organized Industry Zone (OIZ) on the usage of the road circumventing the site to avoid congested roads and possible accidents. Special attention should be given to the mosque opposite the site and the additional traffic it generates during the festive seasons or periods of prayer.

All arrangements with the Organized Industry Zone (OIZ) and the mosque should be written down in separate '*Traffic management document*'.

3.3.3 Hazardous wastes handling

Not all materials present at the site have been tested for their POPs contents but for purposes of application of these guidelines, the entire site should be considered to be contaminated to some degree by POPs. POPs inside the warehouse are stored under very poor conditions and the original packaging is in an equally poor state. Albeit to a lesser extent, outside areas also have variable levels of POPs contamination, including but not limited to the soil immediately around the buildings on-site and all outdoor surfaces.

During activities the site workers can come into contact with POPs or materials that have been impacted by the storage of POPs (such as building materials). Measures should be taken to prevent spreading of and exposure to the POPs from the:

- The POPs wastes
- Materials and equipment present inside the warehouses
- The interiors (walls, floors and roofs) of the warehouses
- Top soil present outside the building
- The surface of the paved area outside

The contractor should include in his *Execution Work Plan* (EWP) the following measures:

- Dust formation should be limited, if needed only outdoor areas should be sprinkled with water to limit dust formation
- Temporary storage of materials collected outside the warehouses should be done in such a way that there is no dust formation
- Work with POPs is always done in teams of a minimum of two persons
- When handling of POPs, dust formation should be kept to a minimum
- Traffic movements on POPs dusts should be limited, where floors have not been cleaned, speed for machinery is kept to a minimum to limit dust formation
- Areas where POPs is packed a lower pressure than that of the outdoor ambient air pressure should be realized
- Areas where POPs are repacked should be compartmentalised from other indoor areas
- Staff, machinery and equipment that work in areas where POPs are repacked should be cleaned prior to transfer to indoor areas and outdoor that have been cleaned
- All materials and equipment leaving the interior areas of the warehouses are considered hazardous wastes unless thoroughly cleaned and approved by the Contracting Party's Representative
- Repacked materials leaving the indoor areas can leave through pallet air lock only (see section 4.3.8 for specifications)

- All equipment shall be cleaned before leaving the site, this includes equipment and materials that have only been used outside the warehouses
- For entry and leaving the contaminated area an access procedure and departure decontamination procedure is applicable (see section 4.3.7)

Accessibility work area

The site should not be accessible to third parties and shall be fenced off and equipped with relevant warning signs. The project office should be located at such a location that it can be reached by authorized visitors without entering the contaminated zones. The work area where POPs wastes and POPs impacted wastes are present should only be accessible for staff via the decontamination unit and for equipment via a provisional airlock. The area is demarcated with plastic barrier tape and warning signs.

No one under 18 years of age, pregnant women and lactating women are not allowed within the site. Employees must be able to identify themselves. Smoking, eating and drinking is only allowed at the resting area outside the working area. Employees who will perform work in the contaminated area must be declared medically fit to perform the work. Visitors to the area must be accompanied at all times.

Safety instruction

All workers should get a safety instruction by the safety officer about the project risks and the required measures including an explanation of the decontamination procedure prior to entrance to the site. The following topics will be discussed:

- The type of POPs presence
- The risks related to exposure POPs
- The risks related to the work with POPs
- The site zoning clean zone, the decontamination zone and makeshift air lock and the contaminated zone
- Using the decontamination zone with the decontaminated unit and makeshift air lock
- The use of Personal Protective Equipment (PPE)
- The use and maintenance of Respiratory Protection Equipment (RPE) filter types and replacement time
- The risk working with mechanical equipment
- The use of pressurized cabin and filters on equipment
- Inform workers on combatting heat stress
- The alarm, the emergency and evacuation procedures
- Rules of conduct under the motto 'We take care of each other, so that everyone arrives home safely and healthy' as illustrated in figure 3.1



Figure 3.1 'We take care of each other, so that everyone arrives home safely and healthy'

Figure 3.1 gives a picture from a set of infographics that can be used to instruct the employees, raise awareness of the staff carrying out the on-site works during the tool box meetings and daily start work analyses. Without these instructions, employees have no access to the site. They sign the attendance list if they understand the instructions. Staff working in the contaminated zone will need to provide proof (i.e. exam) of their understanding of the health and safety instructions. Employees who do not understand the instructions are not allowed to enter the site.

Personal protective equipment

PPE and RPE requirements for staff working with POPs wastes and POPs impacted materials depend on the risk of exposure, the level of dust generated during the works and the odour nuisance. Section 4.3.5 provides PPE input for staff working at the site.

Decontamination unit

All persons that come into contact with POPs wastes and POPs impacted materials shall use a decontamination unit (see section 4.3.7 for details) entering and leaving the contaminated zone.

Lifting and excavation equipment

Mechanical equipment and material that is used indoors must be equipped with a filter pressure system and climate control. When the equipment includes a step it must consist of an open grid to remove contaminants from the operators foot wear. A boots holder must be applied to the outside of the cabin. Doors and windows must be closed during the work.

The pressurized cabin must be provided with the appropriate filters. In order to over-pressure the cabin to give a good protection against the dust or vapours a FFP3-filter must be used.

Because of the presence of organic pollution also a carbon filter (A2) is recommended. Excess pressure shall be at least 100 Pascal. Before starting the excavation the log shall be consulted if the filters are replaced in time and the over pressure is sufficient.

Inspection

The safety officer shall carry out safety inspections. With an inspection it will be verified if the appropriated measures have been taken, the Rules of conduct are well respected and regulations are enforced. A written record and log of such inspections should be made.

3.3.4 Working on heights

During the execution of several activities there is a chance that employees are working at heights, especially during the cleaning and demolition of walls and roofs and the emptying of drums in Warehouse 2. The contractor must take all necessary safety measures to prevent and/or reduce the hazards related to working at heights. These measure vary from not allowing staff to climb on the stacks of drum; only use cherry picker, ladders and/or scaffolds to reach high. In case the contractor is using a cherry picker (or similar equipment) the employees working with this equipment are adequately trained using it.

3.3.5 Lifting and lowering

For lifting and lowering of bags and drums filled with POPs wastes the following safety precautions apply:

- Manual lifting of bags with POPs wastes can only be done in teams of two
- During mechanical lifting of POPs wastes staff cannot be standing on POPs wastes bags
- Machines used for lifting and lowering of bags should be positioned on stable straight subsurface
- Machinery used on the work site should be equipped with back-up alarm signal
- It is prohibited to stand underneath a load
- Area near machines should be clear from people during lifting actions

For lifting and lowering of drums with POPs wastes the following safety precautions apply:

- Any liquids present inside the drums should be collected prior to lifting of drum(s)
- Area near machines should be clear from people during lifting and lowering
- Climbing on drums for hooking of drums is prohibited
- Cutting of drums for removal of contents can be done with pneumatic scissors or other non-heat generating equipment only

3.3.6 Demolition

It cannot be assured that the concrete floors, especially after removal of the contaminated top layers, have sufficient bearing capacity for heavy machinery. Contractor should use crane mats when in doubt of the bearing capacity of the concrete floors. Damages to the concrete site floors should be repaired after the execution of the works.

In case of selective demolition of warehouse walls proof should be provided in the HASP, that the warehouse frame is sufficiently strong (construction integrity of the building) to prevent collapse of warehouse roofs and / or walls when part of the building blocks are removed.

Demolition of asbestos containing materials should be done:

- With staff using the adequate PPE to work safe (no exposure to asbestos)
- With as little as possible damage to materials (no breaking of asbestos plates)
- As much as possible manually
- With electric and pneumatic rotating equipment using less than 100 rotations per minute
- With linear saw with a speed lower than 25 meter per minute
- By packing asbestos containing materials as soon as possible after demolition

The area near operating equipment and machines, used to demolish the warehouses should be clear from people during action. When reversing the back-up alarm signal should be use. During the whole demolition works and especially during the asbestos removal, the safety supervisor is present.

3.3.7 Cleaning

Formation of dust during the cleaning of floors, walls and materials is kept to a minimum. For cleaning the floors and walls dusts are collected by vacuum sweeping, shovelling, scrapping and vacuum cleaning. The collected POPs repacked with the POPs wastes.

Cleaning of outdoor areas and decontamination unit is done wearing the PPE appropriate for the most stringent zone in which the cleaning takes place.

3.4 Summary site activities risks

Table 3.2 includes a risk assessment (design phase of the project) with corresponding suggestions for mitigation. Only the specific risks for this project are given. Standard working risks are not stated in this risk-analysis. A semi quantitative risk assessment for the same risks is given in Appendix 1. Appendix 1 gives risk scores by using Fine and Kinney Method.

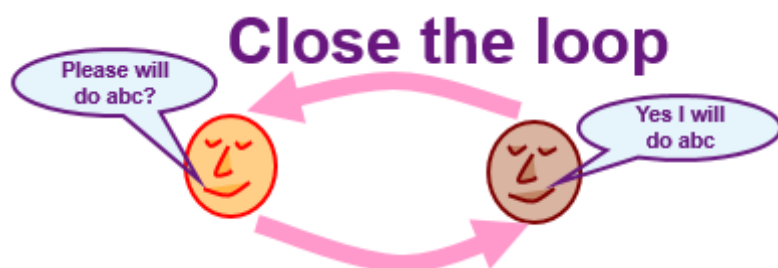


Figure 3.2 Check if your message is understood

Table 3.2 Risk resulting from the work related activities

Subject	Possible risk cause	Possible consequence	Suggestion of measures
Working with people with multiple nationalities	<ul style="list-style-type: none"> Workers do not understand safety rules and instructions Workers do not understand proposed working methods Workers do not properly follow safety rules 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents Unexpected situations that influences the end result in time money and expectations 	<ul style="list-style-type: none"> Safety instructions present in both Turkish and English Using for training infographics Check if workers understand the given safety information by using pre-training and post-training HSE questionnaire By giving instructions use a close loop (check if your message is understood see figure 3.2) Use national instructors or if necessary, use a translator
Heat stress	<ul style="list-style-type: none"> Working in space without climate control Working in containment with PPE with warm outside temperature 	<ul style="list-style-type: none"> Dehydration Injuries by falling or fainting Not using PPE and RSP causing exposure to POPs 	<ul style="list-style-type: none"> Take sufficient breaks – generally two hours working, one hour break, more if temperatures rise above 30 degrees or work in situations exposed to sunshine is required Make available cooler packs for staff in case temperature is above 25 degrees Celsius Provide sufficient liquids to staff during breaks Limit manual labour in temperatures above 30 degrees Celsius

Subject	Possible risk cause	Possible consequence	Suggestion of measures
			<ul style="list-style-type: none"> Adjust working hours for staff working in exposed environment (sunshine) to avoid working in period of 11:00 – 15:00 during periods with temperatures above 30 degrees Celsius ISO 7243 is leading indicator for heat stress at work area
Working with other parties/contractors at the same time on-site	<ul style="list-style-type: none"> No coordination of activities, road blocks 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents Unexpected situations that influences the end result in time money and expectations 	<ul style="list-style-type: none"> Have daily start work analyses Coordination of all activities of all parties working on site One assigned safety advisor for all contractors
Working with (heavy)machinery inside	<ul style="list-style-type: none"> Exhausts of machine indoor cause carbon monoxide levels to increase 	<ul style="list-style-type: none"> Serious injury, death by exposure to carbon monoxide 	<ul style="list-style-type: none"> Where possible work with electric machines Install carbon monoxide warning systems in all enclosed spaces where petro/diesel based engines are used Provide adjusted ventilation system, equipped with dust filters.
Working with (heavy)machinery	<ul style="list-style-type: none"> Standing in the line of fire Standing in the reach of turning equipment Standing too close by the rotating equipment/machinery 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents 	<ul style="list-style-type: none"> Wearing personal protective equipment (safety helmet) Use back-up alarm signal Instruction that there has to be visual contact between the operator and the worker(s) outside the machines Have a safety watch during operation Machines should operate with pressurized cabin so operator does not have to wear full face mask as PPE (better visibility) Never work in the line of fire, provide instruction on this matter Protect rotating equipment

Subject	Possible risk cause	Possible consequence	Suggestion of measures
Unauthorised people enter the project site	<ul style="list-style-type: none"> Unauthorised people are not aware of the risks 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents 	<ul style="list-style-type: none"> Place fences with lockable entrances Maintaining fences Place information signs on site fences Access control
Emergencies	<ul style="list-style-type: none"> Restricted access to inner parts of the site due to high levels of POPs 	<ul style="list-style-type: none"> Exposure to POPs of emergency crew 	<ul style="list-style-type: none"> Make an <i>emergency response plan</i> Drill staff on emergency situation Install warning system for staff that requires no entry to other working zones (audio and visual) Install emergency exits in warehouse Keep at all times staff present outside the building Provide emergency shower Make sure a minimum of two first aid responders are available on site (this may be combined function).
Storage of materials and equipment	<ul style="list-style-type: none"> Instability of materials and equipment, free access of storage 	<ul style="list-style-type: none"> Falling, breaking, damage of materials and equipment, physical overload, loss of materials 	<ul style="list-style-type: none"> Storage behind fences or closed containers Storage on predetermined location Storage of contaminated materials only within confines of the site No outdoor storage of POPs wastes or POPs impacted materials
Mobilization and demobilization installation, materials and equipment	<ul style="list-style-type: none"> Limited space No separate pedestrian and vehicle lanes at the adjacent Inattention Organized Industry Zone related traffic Poor visibility 	<ul style="list-style-type: none"> Injury/casualty by accidents by equipment, trucks/lories entering and leaving the site 	<ul style="list-style-type: none"> Make a <i>site layout map</i> Installing warning signs with 'CAUTION, Road works ahead 50 m' Appoint two traffic supervisors to control traffic during equipment, lorries/truck entering or leaving the site Give information and instructions to workers Assign specific parking area's for trucks/lories

Subject	Possible risk cause	Possible consequence	Suggestion of measures
Trucks leaving the site	<ul style="list-style-type: none"> Contamination of roads 	<ul style="list-style-type: none"> Injuries, accidents due to slippery road 	<ul style="list-style-type: none"> Warning signs at entrances Cleaning of all equipment before leaving the site Keep project outdoor surfaces and public road clean
Installation of fences and gates	<ul style="list-style-type: none"> Limited space between public road and site during installation of fences and gates 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents 	<ul style="list-style-type: none"> Implement traffic control measures when working at site boundaries
Handling POPs	<ul style="list-style-type: none"> Heating of POPs wastes due to processing and creation of gasses 	<ul style="list-style-type: none"> Exposure to unexpected gasses and vapours Damage by fire 	<ul style="list-style-type: none"> Limit heat formation in processing equipment Wear additional PPE Have fire extinguisher at hand Monitor process and check for temperature
Handling asbestos	<ul style="list-style-type: none"> Removing and packaging asbestos containing material 	<ul style="list-style-type: none"> Exposure/inhalation to asbestos 	<ul style="list-style-type: none"> Well trained and informed staff Good planning of activities Use PPE in case eight hour time weighted average value (ZAOD-TWA) of the asbestos concentration in the air exposed to the workers in the works exceeds 0.1 fibre / cm³ Manually remove asbestos sheets Damage asbestos sheets as little as possible No usage of electric or pneumatic equipment with a RPM greater than 100 revolutions/min or linear saw speed of 25 meter /minute to limit dust formation Pack materials as soon as possible
Handling POPs wastes	<ul style="list-style-type: none"> High POP dust formation during activities 	<ul style="list-style-type: none"> Damage to health, serious injury 	<ul style="list-style-type: none"> Use of independent air supply in situations where dust levels are above 500 mg/m³

Subject	Possible risk cause	Possible consequence	Suggestion of measures
Handling, packaging POPs wastes and POPs impacted materials	<ul style="list-style-type: none"> Contact POPs wastes and POPs impacted materials 	<ul style="list-style-type: none"> Exposure to POPs (inhalation of dust, dermal or eye contact) 	<ul style="list-style-type: none"> Well trained and informed staff Strict enforcement of zoning Wearing PPE Change to supplied air-respirators when dust concentrations are above 50 mg / m³ Work is halted at dust concentrations of > 500 mg / m³ Good planning of activities Good personal hygiene Working in teams Use of makeshift air lock for entry and exit of areas with high dust concentrations Pressurize compartments to contain dusts within warehouse Proper cleaning procedure of equipment and clothing
Demolition of asbestos containing roofing sheeting and wall	<ul style="list-style-type: none"> Unstable position Small work place Working without fall protecting equipment 	<ul style="list-style-type: none"> Injury/casualty by falling. 	<ul style="list-style-type: none"> Use the proper fall protection equipment like harness Use cherry picker as much as possible when working at heights If not possible to use cherry picker use scaffolding
Physical strain	<ul style="list-style-type: none"> Lifting too heavy Not using a lifting aid Manual heavy pushing and shoving Single person lifts instead of in pairs Materials not save or correctly used Physical exposure 	<ul style="list-style-type: none"> Back injury Knee injury Overloading can result into long term body physical damage 	<ul style="list-style-type: none"> Using mechanical lifting equipment Do not lift more than 25 kg manually Do not lift more than 50 kg with two persons Store materials correctly, so it is stable
Handling POPs wastes and POPs impacted wastes	<ul style="list-style-type: none"> Hoisting load falling on workers/people 	<ul style="list-style-type: none"> Injury/casualty by falling objects 	<ul style="list-style-type: none"> Do not stand in the line of fire Use only adequate lifting equipment like forklift Provide even surface for workers to walk on Build loading dock/ramp

Subject	Possible risk cause	Possible consequence	Suggestion of measures
Emptying drums with POPs wastes	<ul style="list-style-type: none"> Exposure to POPs due to breaking of drums that are in poor shape 	<ul style="list-style-type: none"> Exposure to POPs (inhalation of dust, dermal or eye contact) Injury/casualty by falling drum 	<ul style="list-style-type: none"> Do not stand in the line of fire, keep clear of drums when lifting Not lifting above people or working positions Uses cherry picker to secure drums before lifting
Demolition wall	<ul style="list-style-type: none"> Uncontrolled collapse of wall and building structure 	<ul style="list-style-type: none"> Injury/casualty by falling parts of the wall and building 	<ul style="list-style-type: none"> Prior assessment of construction state of warehouse before demolition, take the wind load in consideration as well Clear instruction on demolition order to crew Do not stand next to or under sections under demolition Glass protection for demolition equipment
On-site activities	<ul style="list-style-type: none"> Dust emission (dry weather and surface) 	<ul style="list-style-type: none"> Exposure to POPs by Inhalation of dust 	<ul style="list-style-type: none"> Prevent dust formation at source Spray outdoor floor areas with water Limit speed of machinery and equipment in areas covered in dust to maximum 5 km per hour Remove dusts from cleaned areas at weekly intervals

4 Health and safety requirements

4.1 General requirements

The execution of the work at Merkim site will have different phases. Each phase has its specific health and safety requirements. Therefore the contractor shall implement a cyclic risk management (see figure 4.1). The cyclic risk management shall be based on an approach which takes into consideration all risks that may be involved in the project. It means a systematic process which identifies, accurately evaluates and properly manages risks in order to maximise the project value by:

- Minimising the probability and consequences of threats that will adversely affect the project, and prevent them
- Maximising the probability and consequences of opportunities that will improve the project results

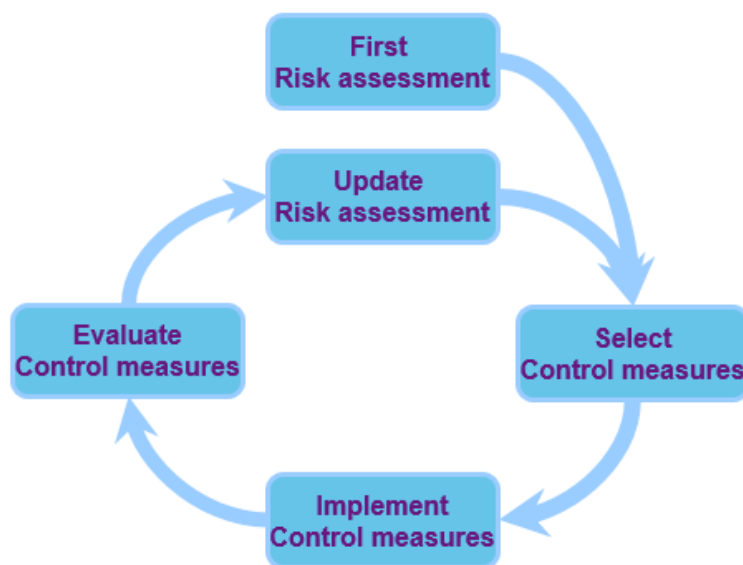


Figure 4.1 The cyclic process of risk management

As earlier mentioned, the contractor(s) will prepare and agree with the contracting party a Contractor HSAP applicable to their scope of work prior to the commencement of the work. It is recommended that this is aligned with the findings elaborated above and also reflecting the health and safety requirements provided in this section.

It is also recommended that the Contractor's HSAP contains a risk assessment file/register detailing the hazards, existing safeguards, risk rankings, and risk reduction measures represented in matrix with qualitative a risk value to be able to prioritize the risks. Such risk assessment is provided as tables 3.1 and 3.3 and Annex 1 as an example to the contractor. The contractor should also provide an updated risk assessment prior to the commencement of the different project phases, or at regular intervals and when unexpected events happen.

The contractor should involve the contracting party and the supervision applied to the work in the first and following risk assessment sessions.

The contractor should also:

- Maintain a safe and healthy working environment during the complete project
- Implement and monitor the requirements from the HASP during the complete project
- Establish and maintain processes to evaluate and review documents and records that are critical to Health and safety performance
- Update risk register and shared this with the contracting party and the Contracting Party's Representative

The following shall be included or addressed in all risk assessment sessions:

- All identified health and safety risks will be assessed
- Each risk will be numbered for reference purposes
- Existing safeguards
- Consequence of exposure to the potential hazard or undesired event (without safeguards)
- Likelihood of the exposure (with safeguards)
- Risk ranking; (for initial and residual risk perception)
- Recommended corrective action(s) delegated to a responsible party
- The date by which action is to be completed

4.2 Execution requirements

4.2.1 Personnel Site Access Control System

Contractor should establish or comply with a unified site access control system to track personnel arriving at or leaving the work site. This applies to contracting party and site owner's personnel, partner personnel, government officials, visitors and contractor personnel. Current site access control system records shall be available at all times upon contracting party's request.

4.2.2 Work Status Board

It is recommended that prior to the commencement of critical high risk activity, a protected location shall be established where an overall picture of work in progress can be easily determined by means of a 'Work Status Board' or diagram posted in this area.

The Work Status Board shall indicate:

- Where work is being carried out
- The nature of the work
- Who is doing the work (list the Person) and who is the supervisor in charge
- When the work will start and when it will be completed

The Work Status Board should be updated prior to the start of every day to reflect the activities to be conducted that day.

4.2.3 Zoning

Workplace should be divided according to level of possible exposure to POPs. As a minimum the site is divided into three zones:

- Zone 1: Clean area
- Zone 2: Intermediate zone consisting of the decontamination unit and the makeshift airlock(s)
- Zone 3: Contaminated zone

Zones should be clearly demarcated and entry points to the zones should be limited to improve workers' observance of the zoning and the associated rules for movement between zones.

The required PPE should be indicated on a sign at the entrance of each zone.

Zone 1: Clean area

Zone 1 is the clean area of the site, in the clean area there is:

- No handling of POPs wastes and POPs impacted wastes other than the repacked POPs wastes and POPs impacted wastes in UN approved packaging in closable containers, trucks or other vehicle ready for off-site transport
- No possibility of contact with POPs wastes or POPs impacted wastes, this includes the presence of (possible) POPs containing dusts and contaminated/used PPE
- A DDT and HCH dusts concentrations below 0.5 mg / m³ (DDT) and/or 0.5 mg / m³ (total HCH) on average during the working day

As the entire site is contaminated to some degree, no parts of the site should be considered as a clean area. To create a clean area within the confines of the site first an area needs to be cleaned or protection measures installed.

Zone 2: Intermediate zone

Zone 2 is the part of the site where temporary storage of POPs wastes or POPs impacted materials takes place. In the intermediate zone:

- There is no visible presence of POPs, this includes all floors and walls and equipment/materials present inside the zone

- DDT and HCH dusts concentrations are below 0.5 mg / m³ (DDT) and/or 12.5 mg / m³ (total HCH) on average during the working day
- No processing including repacking of POPs wastes or POPs impacted wastes takes place
- Only handling, storage and transfer of POPs wastes or POPs impacted wastes in (re)packed state, with the packaging materials complying with UN packaging regulations for POPs.
Exception to this are:
 - The storage of POPs impacted wastes that are being sampled and tested for their POP concentrations. These wastes can be stored in the indoor areas of this zone provided that they are in a designated space and covered when no sampling of the materials takes place
 - The indoor movement of POPs wastes and POPs impacted wastes inside (flexible) bulk containers
- Entry and exit of indoor areas of Zone 2 is through a makeshift airlock, see figure 4.2 and section 4.3.7 for details

It should be noted that walls and floors in Zone 2 can still contain POPs residue (non-visible) as part of their matrix and as such Zone 2 is not considered a clean working area

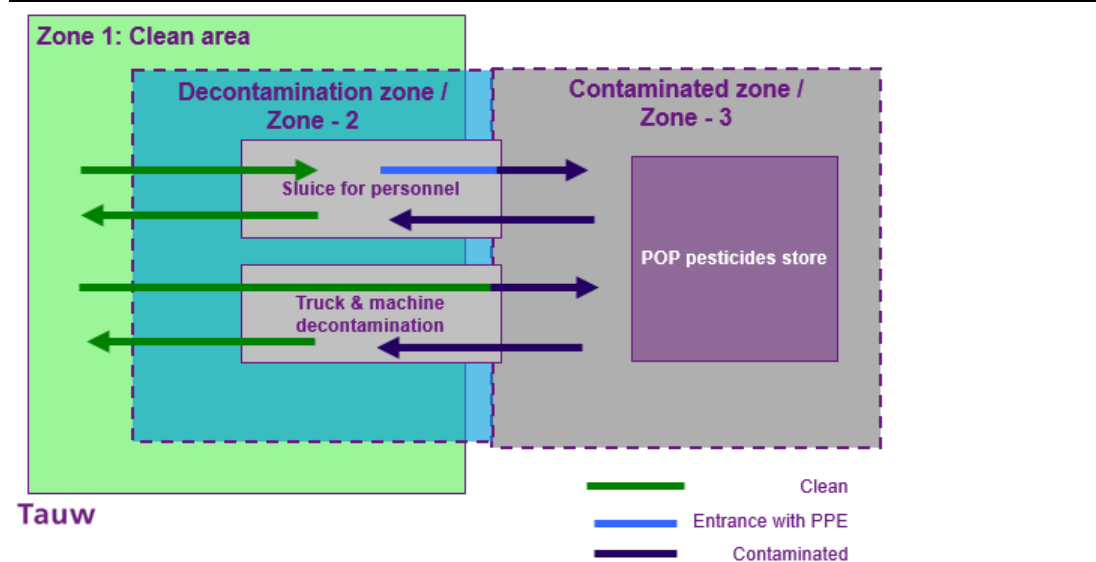


Figure 4.2 Site Zoning and movement between the different zones

Zone 3: Contaminated zone

The contaminated zone is all those parts of the warehouse where POPs wastes, POPs impacted waste and POPs dusts are still visually present. The contaminated zone:

- Is kept at a pressure below the pressure of the outside areas for all those parts of Zone 3 where handling and packaging of POPs wastes and POPs impacted wastes takes place. Pressure inside areas where handling and repackaging of POPs wastes takes place is a minimum 20 Pascal below the outdoor air pressure. Pressure difference is verified on a daily basis during the execution of the works in set area by Contracting Party's Representative
- Staff working in the contaminated zone has to work in teams of 2 as a minimum
- Entry and exit of indoor areas of Zone 3 is through a makeshift air lock, see section 4.3.7 for details

4.2.4 Personal Protective Equipment

All personnel should be provided with the appropriate PPE as required by law, decree, administrative rule or regulation, or other legally binding policy interpretation or pronouncement of a legal jurisdiction or authority. As legally binding requirements for PPE in Turkish are not specific as such the minimum requirements for the three zones mentioned previously are provided in table 4.1. Figure 4.13 is a photograph of staff using PPE in Zone 3 carrying out inventory works.

Table 4.1 Overview of minimum PPE requirements

PPE	Zone 1	Zone 2	Zone 3
Body	Cotton coveralls - visual amplification	Dry conditions White-Tyvek Type 4-5 Working with liquids Yellow- Tyvek type 3	Dry conditions White - Tyvek Type 4-5 Working with liquids Yellow - Tyvek type 3 Use daily disposable underwear
Hands	Working with equipment or machinery nitrile or leather gloves	Nitrile gloves + work gloves Chemical resistant gloves when working with liquids PVC, fully coated, mechanical TS EN 388 and chemical TS EN 374-4 protection	working with liquids Nitrile glove + work gloves Chemical resistant gloves when working with liquids PVC, fully coated, mechanical TS EN 388 and chemical TS EN 374-4 protection
Lungs	Dust mask P3	Half face mask A1B1E1K1 P3 filters	Full face mask with power air purifying respirator A1B1E1K1 P3 filters*
Feet	Safety shoes with a metal safety cap and sole	Safety boots with a metal safety cap and sole	Safety boots with a metal safety cap and sole

PPE	Zone 1	Zone 2	Zone 3
Head	Safety helmet	Safety helmet	Safety helmet
Ears	Near noisy machinery protection	Near noisy machinery protection	Near noisy machinery protection
Eyes	Safety glasses	Dry conditions closed glasses Wet conditions closed glasses with splash guard	Full face mask

* In areas with high dust formation due to works ($DDT > 0.5 \text{ mg / m}^3$, $HCH > 50 \text{ mg / m}^3$), staff is required to work with independent air-supply. During inventory works Half Face Mask with A1B1E1K1 P3 filters are adequate



Figure 4.3 Staff using PPE in Zone 3 for inventory works using Half face instead of full face mask

The contractor will be responsible for:

- Ensuring that appropriate PPE is worn at the work site at all times
- Providing and enforcing the use of required PPE
- Posting signs specifying where PPE use is required
- Using and maintaining all PPE in accordance with manufacturer recommendations and
- Replacing all PPE when defective or lost
- Monitoring dust concentrations in the air continuously at all main dust generating activities

- Monitoring the DDT and HCH concentrations in the air for Zone 2 on a monthly basis
- Stop work when total dust concentrations exceed 500 mg/m³

4.2.5 Zoning transfer protocol

Cross-contamination of staff, materials and equipment by enforcing strict movement between zones should be limited. The tables 4.2 and 4.3 contain staff and equipment/material protocols for movement between zones. All equipment that has been used in Zone 3 has to be cleaned with wet cleaning inside Zone 2 prior to transfer to Zone 1 or use in Zone 2. Materials that have been used or stored in Zone 3 and that cannot be meticulously cleaned have to be tested for their POP concentrations or are assumed to be hazardous wastes (based on a POP concentration > 50 ppm). Off-site transport of equipment and materials that have been used in Zone 3 is subject to approval of Contracting Party's Representative.

Table 4.2 Staff movement between zones

Staff movement on site			
From	To Zone 1	To Zone 2	To Zone 3
Zone 1		Only via decontamination Additional PPE required No decontamination needed	Only via decontamination Additional PPE required No decontamination needed
Zone 2	Only via decontamination unit Decontamination needed		Only via decontamination Additional PPE required No decontamination needed
Zone 3	Only via decontamination unit Decontamination needed	Only via decontamination unit Decontamination needed	

The movement of equipment and materials between the zones is indicated in the table 4.3.

Table 4.3 Equipment and materials movement between zones

Equipment and materials movement on site			
From	To Zone 1	To Zone 2	To Zone 3
zone 1		Allowed	Allowed
zone 2	Dust removal by brushing / vacuum cleaning*	Dust removal by brushing**	Allowed
zone 3	Wet cleaning of equipment – materials are considered hazardous wastes unless proven otherwise	Dust removal by brushing in case of incidental transfer for delivery of materials. Equipment and material previously used in Zone 3 cannot be used in Zone 2 without wet cleaning	

* This procedure does not apply to materials and equipment used for the loading of trucks

** This procedure only applies to materials that transfer between the indoor and outdoor areas of Zone 2

4.2.6 Decontamination unit protocol

A decontamination unit protocol for all staff and visitors entering the site should be enforced. Decontamination unit should be split into a clean and a contaminated part, in-between the clean and contaminated parts should be a shower and toilet. The decontamination unit has benches and lockers for all permanent staff in both the clean and contaminated parts.

The site entry procedure (each instance) is as follows:

- Entry of staff to clean zone of decontamination unit via Zone 1
- In the clean area staff undresses of all clothing, shoes, socks and jewellery. Staff put working underwear, camisoles or leggings (Staff working in Zone 3 wear throw away underwear), working socks and step into flip-flops used exclusively for the decontamination unit. Inside the clean room the masks are tested and put on. Inside the clean room staff put on their glasses, disposable Tyveks, two sets disposable of nitrile gloves and their disposable working gloves. Tyveks and gloves are taped shut
- Staff transfers via the shower room to the contaminated room
- Inside the contaminated room staff put on a specialized gloves (if applicable) and transfer to working boots
- Staff working in Zone 1 will not use the decontamination unit

The site exiting procedure (each instance) is as follows:

- Staff ready to depart from Zone 2 and 3 will dry brush and then wet brush their boots before leaving Zone 3 at a boot cleaning station. Each zone has its own boot cleaning station
- Staff with cleaned boots and ready to depart Zone 3 will dry brush (or vacuum clean at low power) each other before leaving Zone 2 and 3 and move towards the decontamination unit. Each zone has its own dry brush or vacuum cleaner
- Staff takes off their boots in front of the contaminated part of the decontamination unit and transfers to decontamination unit using flip flops
- Staff takes off all disposable PPE in the contaminated part, except one layer of nitrile gloves. All disposable PPE are collected in a plastic bag or empty drum and treated as POP wastes. Masks are kept on
- Staff clean their masks with special tissues, while keeping their nitrile gloves on
- After cleaning of the masks, the nitrile gloves are also disposed in the POP wastes drum
- Masks are kept on till into the shower room, there masks are taken off
- All staff have to wash their faces with water and soap after each changing
- Staff working in Zone 3 have to wash their hair after each changing with water
- All staff need to shower and wash their hair at the end of each working day
- In the clean room the normal clothes are put on, staff working in Zone 2 should change and wash undergarments 2x per week

4.2.7 Makeshift Air Locks

Restrictions for the transfer of materials, staff and equipment at the site should be implemented and enforced. Transfer of materials is subject to restrictions at two points:

- Between Zone 2 and 3
- Between inner areas and outside areas of the site

Material that is transferred between Zone 2 and 3 should be transferred through a makeshift air lock. A makeshift air lock is a single closable compartment with dust curtains on both sides and plywood or other type of floor protection that can be cleaned at regular intervals. Compartment is kept at pressure equal to the pressure in Zone 3 to which it is connected. Materials air lock is not used for the transfer of staff or machinery from zone to zone.

Materials that are transferred from indoor to outdoor areas of Zone 2 should be transferred through a two compartment air lock. Indoor compartment consist of a closable compartment with dust curtains on both sides and plywood or other type of floor protection that can be cleaned at regular intervals. Compartment is kept at a pressure equal to 20 Pascal below the outdoor air pressure. Inside the indoor compartment materials leaving the site are wrapped in cling film. Outdoor compartment has the same configuration as the indoor compartment.

Staff and equipment makeshift air locks

Transfer of staff and equipment is subject to restrictions at two points:

- Between Zone 2 and 3
- Between inner areas and outside areas of the site

Makeshift air locks for staff and equipment consist of closable compartment with dust curtains at both sides. When not in use the compartment is kept closed. Cleaning of equipment, boots and all objects that have come into contact with the site floors, is done prior to entering of the makeshift airlock for exiting the zone.

Implementation Arrangements

Contractor and contracting party shall agree upon implementation arrangements, to be documented in the Execution Work Plan. The function of this is to address and assist in the control of interfaces between the various parties, contractors, contracting party and other third parties at the work site. It should address each of the following:

1. The contractor's management structure as applied to the work site and where and how it will interface with others during the work
2. A definition of planning, work supervision, coordination, reporting, control roles and responsibilities within the contractor's and contracting party's organizations and as applicable outside stakeholder parties.
3. Day-to-day communication, e.g. in the context of defining work activities and associated routines, identifying and managing change and other related processes and reporting formats
4. Development of a base work program and how that will evolve and be reported against during the execution of the work, risk assessment, manning, equipment and other resource issues and emergency procedures
5. Materials and equipment certification, operation and security/ control.
6. Internal control, independent audits of activities from a management and compliance (e.g. with H&S requirements) perspective and
7. arrangements in the event of emergencies including listing of emergency numbers and aid points, emergency response, communication requirements and contacting protocols

5 Site safety and security

For being able to review the H&S performance the contractor should provide information describing H&S-system, monitoring and the reporting structure. This section elaborates on the monitoring and reporting.

5.1 Near Misses, Incidents and Emergency Response

Incident and Near Miss Reporting

Occurred incidents and near misers shall be reported by:

- Immediately and accurately report all incidents and near misses to contracting party. Initial reports shall include the following minimum information on the incident/near miss:
 - Date and time
 - Location
 - Reporting person
 - Description
 - Personnel involved, including name, position and organisation
- Promptly and accurately report all incidents/injuries to the applicable governmental authorities in accordance with local regulations
- Maintain required forms pursuant as required by law, decree, administrative rule or regulation, or other legally binding policy interpretation or pronouncement of a legal jurisdiction or authority
- Promptly send to contracting party copies of all government safety or health citations against the contractor resulting from or relating to the incident, while performing work

Incident Investigation

The safety management system shall include procedures to investigate all recordable injuries (including first aids), incidents and near misses. The objectives of these investigations shall be to:

- Determine root causes
- Identify ways to prevent similar occurrences

Procedures should be in place to reinforce accountability and cover accident repeater cases, cases of blatant disregard for known safety procedures, and failure to follow supervisor instructions.

Emergency Response

As part of the Contractor HASP or as a separate plan, an '*Emergency Response Plan*' should be in place which recognizes the roles and responsibilities of all those with a role to play in an emergency situation, and in particular, the extent to which the contractor is involved in this plan.

The *Emergency Response Plan* should describe how emergencies will be managed, including the necessary equipment and systems to:

- Identify emergency response resources and their availability. This includes manpower with specialist knowledge and experience and emergency response equipment
- Prevent and contain releases/discharges from the worksite, including mitigating impacts to the environment or the community, and providing for recovery
- Respond to first aid and other medical emergencies, fires, explosions, rescue operations including confined space rescue, severe weather and other identified hazards
- Relocate personnel from areas of danger
- Develop recovery processes to describe how functions, activities and operations will be restored
- Ensure communication responsibilities and authorities are clearly defined
- Establish training and drill programs to improve the proficiency of the Emergency Response Teams. Training shall include emergency procedures, regulatory compliance requirements and communication responsibilities and
- Coordinate emergency response and recovery plans with Contracting Party, nearby industrial and public agency responders and regulators and to communicate plans to these same parties and any other affected parties, including those in the surrounding community

The *Emergency Response Plan* should define the medical services available at the Work Area and the nature of the incidents they would be able to cater for. This should include a description of the medical facilities and the means of transporting the injured party to them in the event of an emergency.

Registration

Registrations shall be legible, easily identifiable and traceable for the period established for their conservation.

5.2 H&S Performance Reporting

The successful implementation of the H&S management system should be identified, monitored and reported. The metrics shall be described as part of H&S Plan. The metrics shall be reported to Contracting Party.

5.3 Inspections

H&S Inspections shall be carried out on a regular and spot check basis in the following areas:

- Site zoning
- Positions/actions of people
- Potential hazards

- Personal protective equipment
- Tools and equipment
- Orderliness/housekeeping
- Procedures

5.4 Inspection

An inspection program shall be defined to ensure correct implementation of H&S Plan, the compliance with project applicable code and standard requirements.

The inspection process is a management activity to assess any process or activity and provides an independent tool to get the evidence that the existing requirements have been met.

5.5 Review, inspection and audit findings

Through contracting party and contractor's review and audit processes, unsafe conditions during the execution of the work and problems will be identified. Each identified risk will be recorded in the risk register evaluated and when needed appropriated risk reduction measures taken.

Contractor, it's staff and any person involved should be obliged to report to the Health and Safety expert of the contractor any unsafe situation, unsafe act and unexpected hazardous conditions.

The Health and Safety expert of the contractor shall take immediately take the appropriate action to end the unsafe situation, stop unsafe act and protect for unexpected hazardous condition.

The actions can be:

- Instruct or take action to change unsafe situation to a safe situation
- Correct the person behaving unsafe
- Remove the person behaving unsafe from the site
- Close part or the complete site until hazardous conditions is over
- Stop the activity until it can be carried out safe
- Stop all works
- Evacuate the site

Appendix

1

Risk assessment

FINE & KINNEY METHOD

The risk (R) assessment is done considering three parameters: The probability (P) of an accident or damage occurrence, the exposure at risk frequency (F) and the gravity (G) of the induced consequence. The probability of the damage occurrence during the exposure to a risk factor describes the accidental, stochastic and uncertain character. Kinney have defined 6 probability classes, to whom he allocated certain numerical values. The exposure frequency expresses the time lapse in which the worker is exposed to the risk factor action; this component is estimated by one of the 6 classes described (see below table).

The Kinney method: Description for the probability (P) The Kinney method: Description for the exposure frequency (F)

Qualitative description for the probability	Qualitative description for the exposure frequency
Practically impossible	Very rare
Conceivable, (but very unlikely)	Rare
Remotely possible	Infrequent
Unusual but possible	Occasional
Quite possible	Frequent
Almost certain	Continuous

The size of damages is expressed by 6 gravity classes, as can be seen from the table below.

The Kinney method: Description for the gravity (G)

Description (qualitative)	Consequence type	Damage (financially expressed)
Noticeable	First Aid Treatment	
Important	Causality Treatment	< 250€
Serious	Serious Injury	250€ - 2500€
Very serious	Fatality	25000€ - 100000€
Disaster	Multiple Fatalities	125000€ - 250000€
Catastrophe	Numerous Fatalities	> 250000€

A value must be allotted to each of the three factors. Normally, the process should start upwards, by defining for each working task, of the hazards and for each hazards of the risks related. Only after this hazard and risk identification phase (e.g. based on a check – list) the quantification can be initiated. However, if the process is done by a single individual, the process will be a fake, while it offers the unique perspective of a person. Therefore, it can be stated that the need for a multidisciplinary team is obvious. Afterwards, but only after the completion of this first identification phase, will be imagined and developed the risk propagation scenarios. Based on the context setting, the numerical values will be assigned to probability, frequency and gravity; the risk level will be obtained by multiplying these three factors. The value obtained allows then to frame the risks into 5 levels as can be seen from the table below

The Kinney method: the risk ranking scale

Risk level (R)	Risk class	Required action
<10	Low risk	Acceptable risk: no measure required
10-50	Moderate risk	Monitoring
50-	Substantial risk	Measures to be taken
200-400	High risk	Immediate improvement
>400	Very high risk	Activity cessation

Risks resulting from the surrounding land-use

No	Project phase	Activity	Risk cause	Possible consequence	Affected parties	Probability	Frequency	Severity	Risk (Description & Score)	Action	Suggestion of measures
1	Logistic	Traffic on surrounding roads	<ul style="list-style-type: none"> • Busy or narrow roads to get to the site • Inattention of truck and tanker drivers 	<ul style="list-style-type: none"> • Injury/casualty by accidents • Damages by accidents 	<ul style="list-style-type: none"> • All drivers 	<ul style="list-style-type: none"> • Remotely Possible 	<ul style="list-style-type: none"> • Frequent 	<ul style="list-style-type: none"> • Important • (Causality Treatment) 	<ul style="list-style-type: none"> • Moderate Risk • 12,1 	<ul style="list-style-type: none"> • Monitoring 	<ul style="list-style-type: none"> • Preparing Traffic control plan by contractor by contractor • Traffic measures at entrance and exit of the work area • Road warning signs
2	General	Traffic on surrounding roads	<ul style="list-style-type: none"> • Inattention of staff crossing the road 	<ul style="list-style-type: none"> • Injury/casualty by accidents • Damages by accidents 	<ul style="list-style-type: none"> • All workers & employees 	<ul style="list-style-type: none"> • Unusual but Possible 	<ul style="list-style-type: none"> • Occasional 	<ul style="list-style-type: none"> • Very • Serious • Fatality 	<ul style="list-style-type: none"> • Substantial Risk • 94,8 	<ul style="list-style-type: none"> • Measures to be taken 	<ul style="list-style-type: none"> • Warning signs at site exit • Have traffic control or spotter at site exit and at road corners during entry and leaving the site with machinery / vehicles • Address issue at Toolbox meeting and the daily start work analyses

No	Project phase	Activity	Risk cause	Possible consequence	Affected parties	Probability	Frequency	Severity	Risk (Description & Score)	Action	Suggestion of measures
3	General	Location related traffic	<ul style="list-style-type: none"> Inattention of drivers No clear agreements with the Organized Industrial Zone 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents Blocking roads for emergency actions, etc. 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Unusual but Possible 	<ul style="list-style-type: none"> Infrequent 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> Substantial Risk 50,5 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Clear agreements with Organized Industrial Zone and mosque Map and mark the road at the working area Alignment of working hours with the Mosque Forbid parking on the road next to the site
4	Location	Easy site access	<ul style="list-style-type: none"> Unauthorized persons access the site 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents Exposure to contaminants 	<ul style="list-style-type: none"> Unauthorized persons 	<ul style="list-style-type: none"> Unusual but Possible 	<ul style="list-style-type: none"> Infrequent 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> Substantial Risk 50,5 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Fence off/mark site Closed site entrance unless site staff present next to entrance
5	General	Working, In underground	<ul style="list-style-type: none"> No underground cables and/or pipes information at hand Careless work 	<ul style="list-style-type: none"> Injury/casualty by fire and explosions Damages by accidents Damage by fire and explosion Damage and exposure by spills 	<ul style="list-style-type: none"> Digging, drilling workers 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> High Risk 213,3 	<ul style="list-style-type: none"> Immediate improvement 	<ul style="list-style-type: none"> Consult maps/drawings upfront Consult site owners/operators upfront Use detection equipment Digging pilot holes (by hand)

No	Project phase	Activity	Risk cause	Possible consequence	Affected parties	Probability	Frequency	Severity	Risk (Description & Score)	Action	Suggestion of measures
6		Working above ground	<ul style="list-style-type: none"> No above ground cables and/or pipes information at hand Careless work 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents Damages by fire, explosions Damage and exposure by spills 	<ul style="list-style-type: none"> Digging, drilling workers 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> High Risk 213,3 	<ul style="list-style-type: none"> Immediate improvement 	<ul style="list-style-type: none"> Consult owner of the cables and/or pipes Consult maps/drawings upfront Consult site owners/operators upfront

Risk resulting from the work related activities

No	Project phase	Activity	Risk cause	Possible consequence	Affected parties	Probability	Frequency	Severity	Risk (Description & Score)	Action	Suggestion of measures
6	General	Working with people with multiple nationalities	<ul style="list-style-type: none"> Workers do not understand safety rules and instructions Workers do not understand proposed working methods Workers do not properly follow safety rules 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents Unexpected situations that influences the end result in time money and expectations 	<ul style="list-style-type: none"> Foreign employees 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> High Risk 213,3 	<ul style="list-style-type: none"> Immediate improvement 	<ul style="list-style-type: none"> Safety instructions present in both Turkish and English Using for training infographics Check if workers understand the given safety information by using pre-training and post-training HSE questionnaire By giving instructions use a close loop (check if your message is understood see figure 3.2) If necessary, use a translator
7	General	Heat stress	<ul style="list-style-type: none"> Working in space without climate control working in containment with PPE with warm outside temperature 	<ul style="list-style-type: none"> Dehydration Injuries by falling or fainting Not using PPE and RSP causing exposure to POPs 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Frequent 	<ul style="list-style-type: none"> Serious Injury 	<ul style="list-style-type: none"> Substantial Risk 153 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Tae sufficient breaks – generally two hours, one hour break, more if temperatures rise above 30 degrees or work in situations exposed to sunshine is required Make available cooler packs for staff in case temperature is above 25 degrees Celsius Provide sufficient liquids to staff during breaks Limit manual labor in temperatures above 30 degrees Celsius Adjust working hours for staff working in exposed environment (sunshine) to avoid working in period of 11:00 – 15:00 during periods with temperatures above 30 degrees Celsius ISO 7243 is leading indicator for heat stress at work area
8	General	Working with other parties/contractors on one construction site	<ul style="list-style-type: none"> No coordination of activities, road blocks 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents Unexpected situations that influences the end result in time money and expectations 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Continuous 	<ul style="list-style-type: none"> Serious Injury 	<ul style="list-style-type: none"> High Risk 284 	<ul style="list-style-type: none"> Immediate improvement 	<ul style="list-style-type: none"> have a daily start work analyses Coordination of all activities on site, One assigned safety advisor for all contractors

No	Project phase	Activity	Risk cause	Possible consequence	Affected parties	Probability	Frequency	Severity	Risk (Description & Score)	Action	Suggestion of measures
9	General	Working with (heavy)machinery inside	<ul style="list-style-type: none"> Exhausts of machine indoor cause carbon monoxide levels to increase 	<ul style="list-style-type: none"> Serious injury, death by exposure to carbon monoxide 	<ul style="list-style-type: none"> Confined spaces workers 	<ul style="list-style-type: none"> Unusual but Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> Substantial Risk 95 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Where possible work with electric machines Install carbon monoxide warning systems in all enclosed spaces where petro/diesel based engines are used Provide adjusted ventilation system, equipped with dust filters.
10	General	Working with (heavy)machinery	<ul style="list-style-type: none"> Standing in the line of fire Standing in the reach of turning equipment Standing too close by the rotating equipment/machinery 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents 	<ul style="list-style-type: none"> All workers 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Infrequent 	<ul style="list-style-type: none"> Very serious Fatality 	<ul style="list-style-type: none"> Substantial Risk 114 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Wearing personal protective equipment (safety helmet) Use back-up alarm signal Instruction that there has to be visual contact between the operator and the worker(s) outside the machines Have a safety watch during operation Machines should operate with pressurized cabin so operator does not have to wear full face mask as PPE (better visibility) Never work in the line of fire, provide instruction on this matter Protect rotating equipment
10	Site layout	Unauthorised people enter the project site	<ul style="list-style-type: none"> Unauthorized people are not aware of the risks 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents 	<ul style="list-style-type: none"> Trespassers 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Serious 	<ul style="list-style-type: none"> Substantial Risk 85 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Place fences with lockable entrances Maintaining fences Place information signs on site fences Access control!
11	Site layout	Emergencies	<ul style="list-style-type: none"> Restricted access to inner parts of the site due to high levels of POPs 	<ul style="list-style-type: none"> Exposure to POPs of emergency crew 	<ul style="list-style-type: none"> Emergency Crew and workers 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Infrequent 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> Substantial Risk 114 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Make an emergency response plan Drill staff on emergency situation Install warning system for staff that requires no entry to other working zones (audio and visual) Install emergency exits in warehouse Keep at all times staff present outside the building Provide emergency shower Make sure a minimum of two first aid responders are available on site (this may be combined function)

No	Project phase	Activity	Risk cause	Possible consequence	Affected parties	Probability	Frequency	Severity	Risk (Description & Score)	Action	Suggestion of measures
12	Site layout	Storage of materials and equipment	<ul style="list-style-type: none"> Instability of materials and equipment, free access of storage 	<ul style="list-style-type: none"> Falling, breaking, damage of materials and equipment, physical overload, loss of materials 	<ul style="list-style-type: none"> All workers 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Serious 	<ul style="list-style-type: none"> Substantial Risk 85 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Storage behind fences or closed containers Storage on predetermined location Storage of contaminated materials only within confines of the site No outdoor storage of POPs wastes and POPs impacted materials
13	Traffic entering and leaving the site	Mobilization and demobilization installation, materials and equipment	<ul style="list-style-type: none"> Limited space No separate pedestrian and vehicle lanes at the adjacent Inattention Organized Industry Zone related traffic Poor visibility 	<ul style="list-style-type: none"> Injury/casualty by accidents by equipment, trucks/lories entering and leaving the site 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> High Risk 213 	<ul style="list-style-type: none"> Immediate improvement 	<ul style="list-style-type: none"> Make a site layout map Installing warning signs with 'CAUTION, Road works ahead 50 m' Appoint two traffic supervisors to control traffic during equipment, lorries/truck entering or leaving the site Give information and instructions to workers Assign specific parking area's for trucks/lories
14	Traffic entering and leaving the site	Trucks leaving the site	<ul style="list-style-type: none"> Contamination of roads 	<ul style="list-style-type: none"> Injuries, accidents due to slippery road 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Unusual but Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Serious Injury 	<ul style="list-style-type: none"> Moderate Risk 38 	<ul style="list-style-type: none"> Monitoring 	<ul style="list-style-type: none"> Warning signs at entrances Cleaning of all equipment before leaving the site Keep project outdoor surfaces and public road clean
15	Traffic entering and leaving the site	Installation of fences and gates	<ul style="list-style-type: none"> Limited space between public road and site during installation of fences and gates 	<ul style="list-style-type: none"> Injury/casualty by accidents Damages by accidents 	<ul style="list-style-type: none"> Other people 	<ul style="list-style-type: none"> Unusual but Possible 	<ul style="list-style-type: none"> Infrequently 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> Substantial Risk 50,5 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Implement traffic control measures when working at site boundaries
16	Hazardous waste handling	Handling of POPs	<ul style="list-style-type: none"> Heating of POPs due to processing, creation of gasses 	<ul style="list-style-type: none"> Exposure to unexpected gasses and vapors Damage by fire 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Remotely Possible 	<ul style="list-style-type: none"> Infrequent 	<ul style="list-style-type: none"> Very Serious 	<ul style="list-style-type: none"> Moderate Risk 22,7 	<ul style="list-style-type: none"> Monitoring 	<ul style="list-style-type: none"> Limit heat formation in processing equipment Wear additional PPE Have fire extinguishers Monitor process and check for temperature
17	Hazardous waste handling	Handling POPs containing materials	<ul style="list-style-type: none"> High POP dust formation during activities 	<ul style="list-style-type: none"> Damage to health, serious injury 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Almost Certain 	<ul style="list-style-type: none"> Frequent 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> Very High Risk 853 	<ul style="list-style-type: none"> Activity cessation 	<ul style="list-style-type: none"> Use of independent air supply in situations where dust levels are above 15 mg/m3
18	Hazardous waste handling	Handling, packaging POPs wastes and POPs impacted materials	<ul style="list-style-type: none"> Contact POPs wastes and POPs impacted materials 	<ul style="list-style-type: none"> Exposure to POPs (inhalation of dust, dermal or eye contact). 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Frequent 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> High Risk 384 	<ul style="list-style-type: none"> Immediate improvement 	<ul style="list-style-type: none"> Well trained and informed staff Strict enforcement of zoning Wearing PPE Change to supplied air-respirators when dust concentrations are above 50 mg / m3 Work is halted at dust concentrations of > 500 mg / m3 Good planning of activities Good personal hygiene Working in teams Use of makeshift airlocks for entry and exit of areas with high dust concentrations Pressurize compartments to contain dusts within warehouse Proper cleaning procedure of equipment and clothing

No	Project phase	Activity	Risk cause	Possible consequence	Affected parties	Probability	Frequency	Severity	Risk (Description & Score)	Action	Suggestion of measures
19	Hazardous waste handling	Handling asbestos	<ul style="list-style-type: none"> Removing and packaging asbestos containing material 	<ul style="list-style-type: none"> Exposure/inhalation to asbestos 	<ul style="list-style-type: none"> Demolition workers 	<ul style="list-style-type: none"> Unusual but Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> Substantial Risk 114 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Well trained and informed staff Good planning of activities Use PPE in case eight hour time weighted average value (ZAOD-TWA) of the asbestos concentration in the air exposed to the workers in the works exceeds 0.1 fiber / cm³ Manually remove asbestos sheets Damage asbestos sheets as little as possible No usage of electric or pneumatic equipment with a RPM greater than 100 revolutions/min or linear saw speed of 25 meter /minute to limit dust formation Pack materials as soon as possible
20	Working on heights	Demolition of asbestos containing roofing sheeting and wall	<ul style="list-style-type: none"> Unstable position Small work place Working without fall protecting equipment 	<ul style="list-style-type: none"> Injury/casualty by falling. 	<ul style="list-style-type: none"> All workers 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Serious Injury 	<ul style="list-style-type: none"> Substantial Risk 85 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Use the proper fall protection equipment like harness Use cherry picker as much as possible when working at heights If not possible to use cherry picker use scaffolding Information and instruction to workers, Wearing PPE Using fall protection while working at heights
21	Lifting and lowering	Physical strain	<ul style="list-style-type: none"> Lifting too heavy Not using a lifting aid Manual heavy pushing and shoving, Single person lifts instead of in pairs Materials not save or correctly used Physical exposure 	<ul style="list-style-type: none"> Back injury Knee injury Overloading can result into long term body physical damage 	<ul style="list-style-type: none"> All workers 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Frequent 	<ul style="list-style-type: none"> Serious Injury 	<ul style="list-style-type: none"> Substantial Risk 153 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Using mechanical lifting equipment Do not lift more than 25 kg manual Do not lift more than 50 kg with two persons Store materials correctly, so it is stable.
22	Lifting and lowering	Handling POPs	<ul style="list-style-type: none"> Hoisting load falling on workers / people 	<ul style="list-style-type: none"> Injuries/casualty by falling objects 	<ul style="list-style-type: none"> All workers 	<ul style="list-style-type: none"> Unusual but Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Serious Injury 	<ul style="list-style-type: none"> Moderate Risk 38 	<ul style="list-style-type: none"> Monitoring 	<ul style="list-style-type: none"> Using mechanical lifting equipment Do not lift more than 25 kg manually Do not lift more than 50 kg with two persons Store materials correctly, so it is stable Do not stand in the line of fire Use only adequate lifting equipment like forklift Provide even surface for workers to walk on Build loading dock/ramp
23	Lifting and lowering	Emptying drums with POPs wastes	<ul style="list-style-type: none"> Exposure to POPs due to breaking of drums that are in poor shape 	<ul style="list-style-type: none"> Exposure to POPs (inhalation of dust, dermal or eye contact) 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Unusual but Possible 	<ul style="list-style-type: none"> Infrequent 	<ul style="list-style-type: none"> Serious Injury 	<ul style="list-style-type: none"> Moderate Risk 20 	<ul style="list-style-type: none"> Monitoring 	<ul style="list-style-type: none"> Do not stand in the line of fire, keep clear of drums when lifting Not lifting above people or working positions Uses cherry picker to secure drums before lifting

No	Project phase	Activity	Risk cause	Possible consequence	Affected parties	Probability	Frequency	Severity	Risk (Description & Score)	Action	Suggestion of measures
24	Demolition	Demolitions of walls	<ul style="list-style-type: none"> Uncontrolled collapse of wall and building structure 	<ul style="list-style-type: none"> Injuries/casualty by falling parts of the wall and building 	<ul style="list-style-type: none"> Demolition workers 	<ul style="list-style-type: none"> Remotely Possible 	<ul style="list-style-type: none"> Occasional 	<ul style="list-style-type: none"> Very Serious Fatality 	<ul style="list-style-type: none"> Substantial Risk 51 	<ul style="list-style-type: none"> Measures to be taken 	<ul style="list-style-type: none"> Prior assessment of construction state of warehouse before demolition, take the wind load in consideration as well Clear instruction on demolition order to crew Do not stand next to or under sections under demolition Glass protection for demolition equipment
25	Cleaning	General activities on site	<ul style="list-style-type: none"> Dust emission (dry weather and surface) 	<ul style="list-style-type: none"> Inhalation of dust, damage to health 	<ul style="list-style-type: none"> All workers & employees 	<ul style="list-style-type: none"> Quite Possible 	<ul style="list-style-type: none"> Frequent 	<ul style="list-style-type: none"> Very Serious (Fatality) 	<ul style="list-style-type: none"> High Risk 384 	<ul style="list-style-type: none"> Immediate improvement 	<ul style="list-style-type: none"> Prevent dust formation at source Spray outdoor floor areas with water Limit speed of machinery and equipment in areas covered in dust to maximum 5 km per hour Remove dusts from cleaned areas at weekly intervals

