

## Guidance on Preparation and Updating of Report on Industrial Activity

Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations 1996

FOREWARD

Since the introduction of Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulation 1996, employer or occupier of major hazard installations have been preparing and periodically updating Report on Industrial Activity as required under the Regulations. The reports are submitted to the Department of Occupational Safety and Health (DOSH) for review in accordance to the requirements prescribed in the Regulations.

From the review, DOSH have found inconsistency on the format, contents and quality of the reports submitted by the various industries. For example, some reports were found to be incomplete due to lack of information or supporting documents, resulting in a number of clarification and follow-up required by both parties before the report is finally accepted as complete and satisfactory by DOSH.

DOSH has noticed that one of the main reasons for the above problems is the absence of clear guideline on what constitute a good and comprehensive report which meets the regulatory requirements and acceptable to DOSH. This is further aggregated by the different levels of knowledge, formats and approaches of the facility owners, third party consultants including Competent Persons in preparing and reviewing the reports.

To overcome these problems, DOSH has published this Guideline for Preparation and Updating of Report on Industrial Activity as guidance to the facility owners and relevant parties involved in preparation and updating of the reports. It has been prepared taking into consideration requirements of the Regulations, industries best practices, DOSH past experience in reviewing the reports and input from Competent Persons from the industries.

With this new guideline, it is hoped that the owner of major hazard installations and parties responsible for the preparation and review of the report are aware of the requirements and able to produce a comprehensive report meeting the requirement of the Regulations and expectation of DOSH. This will also ensure consistency on the report format and contents across the industries.

I would like to emphasize to all owners of major hazards installation to use this guideline as a source of reference in preparing Report on Industrial Activity and meeting the requirements under the Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulation 1996. The industries are welcome to give any comment and recommendation to DOSH at any time so that improvements can be made to this guideline.

Director General  
Department of Occupational Safety and Health  
Malaysia

#### ACKNOWLEDGEMENT

The Guideline for Preparation and Updating of Report on Industrial Activity have been prepared through the joint effort of the Department of Occupational Safety and Health (DOSH) and representatives from the industries, mainly the CIMAH Competent Persons.

DOSH would particularly like to thank the following personnel for their most valuable contributions during the drafting of the guideline.

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## 1.0 INTRODUCTION

This document provides guidelines for preparation and updating of Report on Industrial Activity (termed in this document as “CIMAH Report”) as required under the Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations 1996. It has been developed as guidance to ensure consistency in the format and comprehensiveness of the report in accordance to the requirements prescribed in the Regulations.

Manufacturer or parties involved in the planning, preparation, updating or review of the report should make full use of this document as reference.

## 2.0 TERMS & DEFINITIONS

CIMAH Regulations	Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations 1996
CIMAH Report	Report on Industrial Activity prescribed under CIMAH Regulations
DOSH	Department of Occupational Safety and Health, Malaysia
Competent Person (OKMH)	Competent person (Orang Kompeten Major Hazard) registered with DOSH as prescribed in CIMAH Regulations
MOC	Management of Change
QRA	Quantitative Risk Assessment
Facility Owner	Employer, occupier or highest management personnel (referred to as “Manufacturer” in the CIMAH Regulations) having control of an industrial activity and has the overall responsibility and accountability for safety and operation of the installation or facility
Manufacturer	Employer or occupier having control of an industrial activity
OSBL	Offsite battery limit
Regulations	CIMAH Regulations
Report Preparer	Person who prepares the CIMAH Report

## 3.0 ROLES AND RESPONSIBILITIES

This section defines the roles and responsibilities of key personnel involved in the planning and preparation of CIMAH Report and ensuring compliance to the requirements set forth in the report.

### 3.1 Facility Owner

- 3.1.1 Allocate appropriate resources and make necessary preparation for the planning, development, review and submission of CIMAH Report to DOSH.
- 3.1.2 Provide necessary information and reference documents as required by the Report Preparer for the preparation of the report. In the case where risk assessment report or information for the installation is not available for reference, the Facility Owner should allocate appropriate resources to undertake relevant risk assessment studies required for completion of the CIMAH Report.
- 3.1.3 Ensure information contained in the report are technically accurate.

- 3.1.4 Make declaration on the completeness and accuracy of information in CIMAH Report and sign off in the relevant sections and other supporting documents as follows
- Executive Summary (see **Appendix 1**)
  - Summary of Findings (see **Appendix 2**)
  - Declaration Letter for CIMAH Report and Emergency Response Plan (see **Appendix 3**)
- 3.1.5 Make necessary presentation on the report as may be requested by DOSH
- 3.1.6 Accountable for implementation of the systems, procedures and arrangements described in the report.

### **3.2 Report Preparer**

- 3.2.1 Gather or obtain necessary information and reference documents required for preparation of CIMAH Report
- 3.2.2 Interpret the information, including results of risk assessments, and prepare the report in accordance to the CIMAH Regulations and specification set-forth in this guideline
- 3.2.3 Consult with the Facility Owner to ensure information contained in the report are accurate

### **3.3 Competent Person (OKMH)**

- 3.3.1 In the case Competent Person (OKMH) is also the Report Preparer, undertake all roles and responsibilities as outlined in Section 3.2
- 3.3.2 Understand the industrial activities and processes involved and review the structure and contents of the report, particularly the interpretation and description of risk assessment results, against the requirements prescribed in CIMAH Regulations and set-forth in this guideline
- 3.3.3 Advise Facility Owner on
- completeness of information in the report.
  - gaps and improvements required on management systems and arrangement for managing major accident hazards at the facility
- 3.3.4 Make declaration on the completeness and accuracy of information in the CIMAH Report and sign off in the relevant sections of the report and other supporting documents as follows
- Executive Summary (see **Appendix 1**)
  - Summary of Findings (see **Appendix 2**)
  - Declaration Letter for CIMAH Report and Emergency Response Plan (see **Appendix 3**)
  - CIMAH Report Checklist (see **Appendix 4**)
  - Other documents as may be required by DOSH from time to time

## 4 TIME-FRAME FOR PREPARATION, SUBMISSION AND REVIEW

### 4.1 Preparation of New CIMAH Report

4.1.1 As a guideline, the CIMAH Report preparation can start when key information about the installation are available e.g. upon complete of the risk assessment and design specifications. At this stage, most of the required information as follows may have already been available.

- Information relating to every hazardous substance involved in the industrial activity and its relevant quantity (Schedule 6(a))
- Information relating to the installation (Schedule 6(b))
- Information relating to a potential major accident in the form of risk assessment (Schedule 6(d))

Other information related to the management system for controlling the industrial activity (Schedule 6(c)) can be incorporated at a later stage once they are available.

4.1.2 The Regulations requires the CIMAH Report to be submitted to DOSH three (3) months prior to “commencement of the activity”. As a guideline, this will be interpreted as 3 months prior to introduction (including storage) of hazardous substances onsite, unless otherwise specified by the Director General of DOSH.

### 4.2 Update of CIMAH Report

4.2.1 The 3-year period for subsequent review and submission of the updated/revised CIMAH Report to DOSH will be based on the official date of initial submission by the industry (regardless of date of final or satisfactory acceptance of the report or supporting information by DOSH).

4.2.2 Apart from the 3-year periodic review, CIMAH Regulations specifies that the report to be updated when there is a modification that will “materially affect” the contents of the report. As guideline, this should include, as minimum, the following :

- a) Introduction of a new hazardous substance exceeding the threshold quantity
- b) Significant change in the quantity or throughput of the existing hazardous substance
  - Increase by 50% of the threshold value
  - Any increase or decrease in the quantity which results in major change of risk profile based on risk assessment studies
- c) A modification of, or addition to, the process that could increase the size of a potential major accident
- d) A significant change in the management of the installation (e.g. change of ownership; operatorship e.g. outsourcing of the operation to third party)

The installation should prepare and submit the report 3 months before such modification

#### **4.3 Review of CIMAH Report by DOSH**

- 4.3.1 The CIMAH Report should be reviewed by DOSH within 60 days of submission for any weaknesses or improvement. Any clarification from the Facility Owner should be made within the above time frame.
- 4.3.2 Comments and areas for improvement should be specific
- 4.3.3 Submission of supporting documents to DOSH arising from the review can be done via softcopy or hardcopy

Checklist for the preparation and review is included in **Appendix 4**.

### **5 REPORT FORMAT**

- 5.1 CIMAH Report for a particular site should be prepared in a single document.
- 5.2 The Report can be documented in either hardcopy or electronic form. This will facilitate continuous review and update of the report as a “live” document for day-to-day reference by personnel at the installation.
- 5.3 For the submission of report to DOSH, the report may be submitted in electronic form.

### **6 STRUCTURE AND CONTENTS OF CIMAH REPORT**

CIMAH Report should be prepared according to the structure and contents discussed in **Appendix 1**.

## Format and Contents of CIMAH Report

**1. Executive Summary**

The executive summary should include an introduction about the installation i.e. name, location and ownership/operatorship of the installation, and industrial activities undertaken at the location.

This section should summarize key information and findings from part A, B, C and D of the main report covering the following

- Hazardous substances, the quantity and brief description of hazards created by them
- General description of the facilities and the processes or storage involving hazardous substances
- Arrangements for safe operation in terms of management system, operational control procedures or processes established at site
- Potential sources of major accident and the impact to personnel, properties or environment, and the consequences to the surrounding in the form of appropriate risk measures where possible
- Any action plans which have been identified to close gaps or improve the management of the installation to prevent, control or mitigate major incident.

The executive summary should include statement of declaration and signature by both the Facility Owner and Competent Person to confirm that the details in the report are accurate and up-to-date, and represent the current status of safety performance and risk profile of the site.

Reference can be made to the summary findings contained in Section 2 of this guideline.

**2. Summary of findings** (for revised/updated report)

This section is required to be included for revised or updated CIMAH Report to highlight key changes to the contents, using the prescribed form “RINGKASAN PENEMUAN PEMATUHAN KEPADA JADUAL 6, SUBPERATURAN 14(1), PERATURAN-PERATURAN KESELAMATAN DAN KESIHATAN PEKERJAAN (KAWALAN TERHADAP BAHAYA KEMALANGAN BESAR DALAM PERINDUSTRIAN) 1996”. Sample of the form is shown in **Appendix 2**.

**3. Definitions/Abbreviation**

All acronym, abbreviation and specific terms referred to in the CIMAH Report should be listed and defined.

**4. Introduction**

The scope of coverage of the report should be clearly described in terms of physical boundary of the installation, especially if it is located within close proximity of other installations or if the different units or facilities under the installation is not located within the same site.

## Format and Contents of CIMAH Report

Background of the installation e.g. i.e. name, location and ownership/ operatorship of the installation, and industrial activities undertaken at the location should be included.

If the report is a three year update or resubmission due to modification, a summary should be made of any significant changes, major incidents or advances in the technical aspects of the process or facilities with respect to hazardous substances which have taken place since the last submission.

## 5. Main Report Contents

The main contents of the report should be divided into four (4) parts and structured accordingly as per Schedule 6 (Subregulation 14(1) and 15(1)) of CIMAH Regulations as follows

### Part A Information Relating to the Hazardous Substances

- A.1 *“The name of the hazardous substance as given in Schedule 2 or, for a hazardous substance included under a general designation, the name of the corresponding to the chemical formula of the hazardous substance”*
- A.2 *“A general description of the analytical methods available to the manufacturer for determining the presence of the hazardous substance, or reference to such methods in the specific literature”*
- A.3 *“A brief description of the hazards which may be created by the hazardous substance”*
- A.4 *“The degree of purity of the hazardous substance and the names of the main impurities and their percentages”*

### Part B Information on the Installation

- B.1 *“A map of the site and its surrounding areas to a scale large enough to show any features that may be significant in the assessment of the hazard of risk associated with the size”*
- B.2 *“A scale plan of the site showing the locations and quantities of all significant inventories of the hazardous substances”*
- B.3 *“A description of the process or storage involving the hazardous substances and an indication of the conditions under which it is normally held”*
- B.4 *“The maximum number of person likely to be present on site”*
- B.5 *“Information about the nature of the land use and the size and distribution of the population in the vicinity of the industrial activity to which the report relates”*
- B.6 *“Information on the nearest emergency services (fire station, hospital, police station, community hall etc”*

### Part C Information Relating to the Management System

- C.1 *“The staffing arrangements for controlling the industrial activity with the name of the person responsible for safety on the site and the names of those who are authorised to set emergency procedures in motion and to inform outside authorities”*
- C.2 *“The arrangement made to ensure that the means provided for the safe operation of the industrial activity are properly designed, constructed, tested, operated, inspected and maintained”*

## Format and Contents of CIMAH Report

C.3 *“The arrangement for training of persons working on the site”*

**Part D Information relating to the Potential Major Accidents**

D.1 *“A description of the potential sources of major accident and conditions or events which could be significant in giving rise to one”*

D.2 *“A diagram of the plant in which the industrial activity is carried on sufficient to show the features which are significant as regards the potential for a major accident or its prevention or control”*

D.3 *“A description of the measures taken to prevent, control or minimise the consequences of a major accident”*

D.4 *“Information about the prevailing meteorological conditions in the vicinity of site”*

D.5 *“An estimate of the number of people on-site and off-site who may be exposed to the hazards considered in the report”*

D.6 *“The consequence to the surrounding areas in the form of appropriate risk measures where possible”*

Detailed guidelines on the contents of the above sections are provided in **Table 1**.

**6. References**

All relevant documents been used as reference in preparing the report should be listed.

**7. Appendices**

- a) All attachments should be indexed with proper numbering structure for easy reference.
- b) Unless unavoidable, attachments should be in A4 size for easy documentation.

## Format and Contents of CIMAH Report

**Table 1:** Guideline on the Contents of CIMAH Report as per Schedule 6 (Subregulation 14(1) and 15(1)) of CIMAH Regulations

<b>Part A Schedule 6(a) : Information Relating to the Hazardous Substances</b>
<p><b>GUIDANCE</b></p> <p>This section applies to hazardous substances which is more than 10% of the threshold quantity as per notification to DOSH prescribed in Regulation 7(1)(b) of CIMAH Regulations. For the purpose of this notification, the Facility Owner may declare the actual quantity to be used or stored in the operations. Depending on the design capacity of the installation, any increase in the quantity in the future shall be reported to DOSH in accordance to Regulation 8 of CIMAH Regulations.</p> <p>In identifying hazardous substances and the quantity for notification to DOSH, consideration should be made on the substances related to the processes and storage.</p> <p><u>Process Related</u></p> <p>The activities described should include, not only the process itself, but also any associated onsite storage and transport of the substances.</p> <p>Presence of hazardous substances not associates with process activities in the amount of less than 10% of the threshold quantity will have to be considered only if it could be an initiating event or condition to major accidents involving the process activities. For example:</p> <p><i>50 tons chlorine are used in a <b>chlorination process</b>. Bromine is also present onsite in sub-qualifying quantities and some is used in the chlorination process. Adjacent to the bulk chlorine tank is a bulk LPG tank for the boiler. Varying quantities of other hazardous substances are also used and stored elsewhere on the site.</i></p> <p><i>The quantity of chlorine (50 tons) will trigger the requirement for the CIMAH Report. The use of bromine for chlorination process will have to be included, however the use and storage of bromine or any other hazardous substances elsewhere on the site do not have to be covered unless the aggregated quantity of the same substances within 500 m area exceeds the threshold quantity. As for the LPG, the report should consider whether a fire or explosion involving LPG could bring about a major accident in the chlorination process e.g. from thermal radiation or missile damage to the bulk chlorine tank. Other accidents involving LPG which solely resulting in injury e.g. burn to employees does not have to be included.</i></p> <p><u>Storage Related</u></p> <p>This is applicable to one or more hazardous substances meeting the qualifying quantities at the site. Other substances in sub-qualifying quantities does not have to be included, except in so far as they might be significant in terms of conditions or events which could bring about major accidents involving other qualifying substances.</p> <p>Storage of each substance onsite should be considered separately and aggregated using the aggregation rules in the preamble to Schedule 2 of CIMAH Regulations i.e. aggregation of quantities in storage in each installation or group of installations belonging to the same Manufacturer where the distance between the installations is not sufficient to avoid any aggravation of major accident hazards, or in any case the distance between the installations is less than 500 metres.</p>

## Format and Contents of CIMAH Report

<p><b>A.1</b></p> <p><i>The name of the hazardous substance as given in Schedule 2 or, for a hazardous substance included under a general designation, the name of the corresponding to the chemical formula of the hazardous substance</i></p> <p><b>Schedule 6(a)(i)</b></p>	<p>a. List down individual hazardous substance used or stored within the site. This can be presented in the form of a table as shown in Figure 1 containing the following information, as minimum:</p> <ul style="list-style-type: none"> <li>▪ Name of Substance</li> <li>▪ Hazard Classification (e.g. very toxic, toxic, flammable, explosive, oxidizing or reactive) based on Indicative Criteria or Group specified in Schedule 1 or 2 of CIMAH Regulations</li> <li>▪ Nature of Substance (e.g. raw material, fuel, additives, intermediate product, product or waste)</li> <li>▪ Quantity Likely on Site (tonnes) – This has to be specified in absolute quantity instead of production rate or capacity</li> <li>▪ Threshold Quantity (tonnes)</li> </ul> <p>b. For continuous process where there is no storage facility on site, the quantity should be based on total inventory in process equipment e.g. vessels, pipes etc contained within the battery limit of the installation at any one time.</p> <p>c. The chemical identification of the substances should be specified in the form of commonly used or readily identified names (e.g. phosgene, ethylene dibromide or 1,2 dibromoethane), CAS Number, empirical formula or chemical composition.</p> <p>Generally, trade names should not be used.</p> <p>Multicomponent mixtures such as gasoline or naphtha for example can be identified by means of the CAS number.</p> <p><b>Figure 1 : Hazardous Substances - Example</b></p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="text-align: left;"><i>Hazardous Substance</i></th> <th style="text-align: left;"><i>Hazard Classification</i></th> <th style="text-align: left;"><i>Nature of Substance</i></th> <th style="text-align: left;"><i>Quantity Likely Onsite (tons)</i></th> <th style="text-align: left;"><i>Threshold Quantity (tons)</i></th> </tr> </thead> <tbody> <tr> <td colspan="5"><b><i>Substances above Threshold Quantity</i></b></td> </tr> <tr> <td><i>Chlorine</i></td> <td><i>Toxic</i></td> <td><i>Intermediate Product</i></td> <td><i>15</i></td> <td><i>10</i></td> </tr> <tr> <td><i>Methanol</i></td> <td><i>Highly Flammable Liquid</i></td> <td><i>Finished Product</i></td> <td><i>30000</i></td> <td><i>5000</i></td> </tr> <tr> <td><i>IPA Corrosion Inhibitor (CAS 67-63-0)</i></td> <td><i>Flammable Liquid</i></td> <td><i>Additive</i></td> <td><i>300</i></td> <td><i>200</i></td> </tr> <tr> <td colspan="5"><b><i>Substances above 10% of Threshold Quantity</i></b></td> </tr> <tr> <td><i>LPG</i></td> <td><i>Flammable Gas</i></td> <td><i>Fuel</i></td> <td><i>30</i></td> <td><i>50</i></td> </tr> <tr> <td colspan="5"><b><i>Substances below 10% of Threshold Quantity which could be a potential Initiating Event of Major Accidents</i></b></td> </tr> <tr> <td><i>Bromine</i></td> <td><i>Toxic</i></td> <td><i>Raw Material for Chlorination Process</i></td> <td><i>0.8</i></td> <td><i>10</i></td> </tr> </tbody> </table>	<i>Hazardous Substance</i>	<i>Hazard Classification</i>	<i>Nature of Substance</i>	<i>Quantity Likely Onsite (tons)</i>	<i>Threshold Quantity (tons)</i>	<b><i>Substances above Threshold Quantity</i></b>					<i>Chlorine</i>	<i>Toxic</i>	<i>Intermediate Product</i>	<i>15</i>	<i>10</i>	<i>Methanol</i>	<i>Highly Flammable Liquid</i>	<i>Finished Product</i>	<i>30000</i>	<i>5000</i>	<i>IPA Corrosion Inhibitor (CAS 67-63-0)</i>	<i>Flammable Liquid</i>	<i>Additive</i>	<i>300</i>	<i>200</i>	<b><i>Substances above 10% of Threshold Quantity</i></b>					<i>LPG</i>	<i>Flammable Gas</i>	<i>Fuel</i>	<i>30</i>	<i>50</i>	<b><i>Substances below 10% of Threshold Quantity which could be a potential Initiating Event of Major Accidents</i></b>					<i>Bromine</i>	<i>Toxic</i>	<i>Raw Material for Chlorination Process</i>	<i>0.8</i>	<i>10</i>
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## Format and Contents of CIMAH Report

<p><b>A.2</b></p> <p><i>A general description of the analytical methods available to the manufacturer for determining the presence of the hazardous substance, or reference to such methods in the specific literature</i></p> <p><b>Schedule 6(a)(ii)</b></p>	<p>a. The analytical method should not only limited to “safety or environmental” monitoring to detect presence of hazardous substance in the workplace and/or detect loss of containment, but should also include detection of impurities (e.g. moisture or oxygen contents) or verification of process streams specifications which could be critical to the safety of the process. See Section A.4</p> <p>b. Details of specific analytical methods used in the plant e.g. portable monitoring equipment, online analyser or laboratory analysis should be specified. Specific test method e.g. gas chromatography, light spectrophotometry, titration etc and the reference standard such as ASTM or APHA should be described if applicable</p>
<p><b>A.3</b></p> <p><i>A brief description of the hazards which may be created by the hazardous substance</i></p> <p><b>Schedule 6(a)(iii)</b></p>	<p>a. The information shall include hazards associated with:</p> <ul style="list-style-type: none"> <li>▪ Flammability, explosivity and reactivity of the substances such as flash points, ignition temperatures, combustibility, explosion limits, thermal stability, reactivity or compatibility, reactions or decomposition rates which could be source of major accidents such as toxic release, fire or explosion.</li> </ul> <p>Any subsequent hazards which can be created due to change e.g. thermal decomposition of the product during fire incident should be included.</p> <ul style="list-style-type: none"> <li>▪ Toxicological characteristics e.g. toxicity, persistence irritant effects, long-term effects, synergistic effects, ecotoxic data and the effects to the environment, etc. The route of harm arising from major accident involving the substances e.g. skin contact, inhalation, ingestion, thermal radiation should be described.</li> </ul> <p>It is important that the potential hazards to the environment e.g. food/water contamination be included and description of the health and environmental hazards should focus on acute effect of the substances.</p> <p>b. It is recommended that the above information in item (a) above are presented in the form of a table as shown in the Figure 2.</p>

## Format and Contents of CIMAH Report

**Figure 2 :** Description of Hazards

<i>Hazardous Substance</i>	<i>Fire &amp; Explosion Hazard</i>	<i>Safety and Health Hazard</i>	<i>Environmental Hazard</i>
<i>Chlorine</i>	<ul style="list-style-type: none"> <li>▪ <i>Non combustible, but is a strong oxidizer capable of igniting combustible materials.</i></li> <li>▪ <i>Has low boiling point of -34°C. Closed containers may rupture due to pressure buildup under fire conditions.</i></li> <li>▪ <i>May decompose explosively when heated or involved in fire, producing toxic fumes of hydrogen chloride.</i></li> <li>▪ <i>Fire exposed cylinders may vent contents through pressure relief devices thereby increasing vapor concentration.</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>Contact with gas released from pressurized system may cause burns, severe injury and/ or frostbite</i></li> <li>▪ <i>Corrosive : causes burns to eyes/skin/respiratory tract</i></li> <li>▪ <i>Poisonous (IDLH 10 ppm): May be fatal if inhaled or swallowed</i></li> <li>▪ <i>Inhalation at high concentration/levels can cause breathing difficulty, dizziness and pulmonary edema which can be fatal.</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ <i>May harm aquatic plants and animals if released in excessive quantity into a lake or stream</i></li> </ul>

- b. Reference should be made to reliable sources such as the safety data-sheets (SDS) of the substances. The related reference documents, as minimum the SDS, should be included in the report as attachments or appendices.

**A.4**

*The degree of purity of the hazardous substance and the names of the main impurities and their percentages*

**Schedule 6(a)(iv)**

- a. For every hazardous substances listed in Schedule 6(a)(i), the expected degree of purity should be described in the form of percentage or concentration of its composition as per design specifications.
- b. The names of main impurities which may typically contains in the substances and potentially hazardous to the process if present in certain quantity and could give rise to major accident should be described. Such impurities may include water/moisture or oxygen contents, dust or particulate matters and other contaminants.
- c. Any inherently unstable substances e.g. organic peroxides, iron sulfide or other pyrophoric materials which may exist as contaminants or impurities and potentially hazardous to the safety of personnel or processes should also be included.

<b>Part B</b> <b>Schedule 6 (b) : Information on the Installation</b>
<p><b>GUIDANCE</b></p> <p>This section should contain broad description about the installation to enable its personnel, enforcement authorities and other relevant parties to have a general understanding and clear picture of the main facilities, processes, activities and the associated hazards including essential safety and emergency response features. This includes any information on past, current and future development on the site including status of authorizations for operations which have been agreed and/or granted by relevant authorities, if relevant.</p>

<p><b>B.1</b></p> <p><i>A map of the site and its surrounding areas to a scale large enough to show any features that may be significant in the assessment of the hazard of risk associated with the size</i></p> <p><b>Schedule 6(b)(i)</b></p>	<p>a. Provide a site map showing the location of the installation and its relationship to the surrounding plants or other establishments.</p> <p>b. The maps should be of an adequate scale to show the installation, other plants or establishments and surrounding developments within the area of sufficient coverage in relation to possible impact from catastrophic accidents at the installation.</p> <p>c. The map should indicate the following:</p> <ul style="list-style-type: none"> <li>▪ Residential areas, urban settlement and important buildings and infrastructures (i.e. hospitals, police and fire stations, schools, historical monument, place of worship etc) and other areas that might be at risk from possible major accident.</li> <li>▪ Industrial and agricultural premises particularly those which have a large workforce which might be at risk from major accidents; or which in themselves may lead to an escalation of an off-site incident</li> <li>▪ Transport features e.g. motorway / railway networks, airports, harbours, etc.</li> <li>▪ Access routes to/from the installation and other traffic routes significant for rescue and emergency operations.</li> </ul> <p>d. Where there is a potential major accident to the environment, the map should show local water courses, rivers, lakes, marine environment, aquifers and sites of special scientific interest</p> <p>e. The scale of the maps must be indicated on the drawing.</p>
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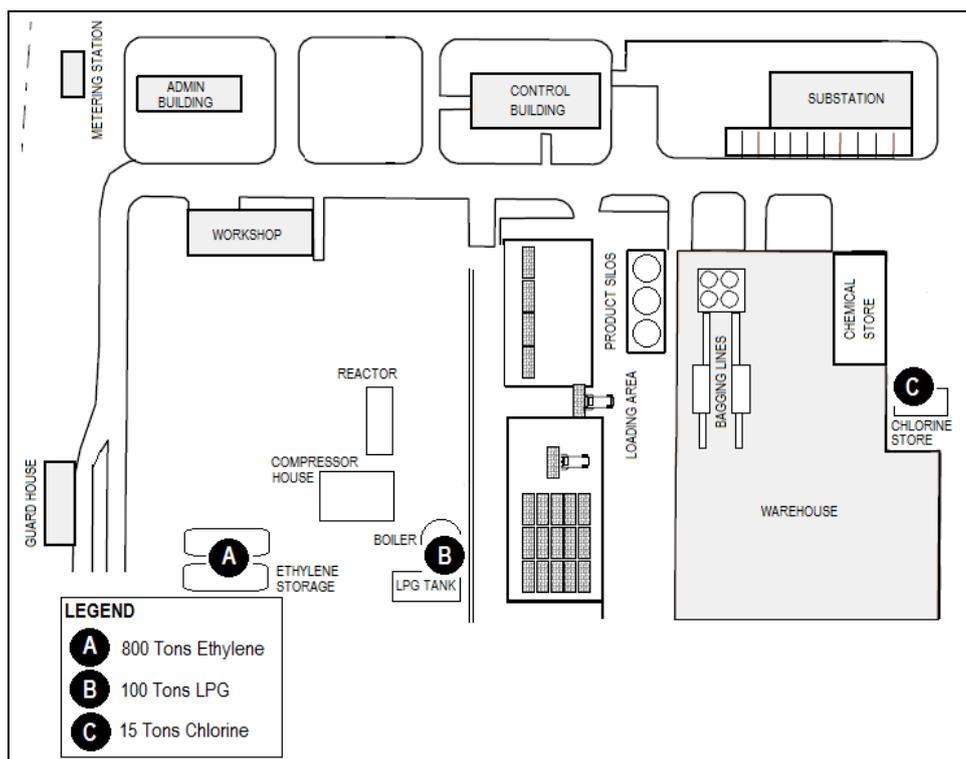
**B.2**

*A scale plan of the site showing the locations and quantities of all significant inventories of the hazardous substances*

**Schedule 6(b)(ii)**

- a. Beside the site map showing the installation in relation to the surrounding areas as discussed in Part B.1, specific layout plan(s) of the installation should be included.
- b. The layout plan should be of suitable scale to adequately show facilities, infrastructures and other activities on the installation such as follows:
  - Process units or facilities (e.g. reactor, furnaces, compressors, vessels etc)
  - Storage tanks
  - Utilities units or facilities (e.g. plant air system, cooling tower, steam generation, fire water system etc)
  - Control rooms and operator shelters
  - Outside battery limit (OSBL) facilities e.g. administration building, laboratory, warehouse, clinic, workshop, fire station, electrical substation, wastewater treatment plant, firewater tank/pond etc
  - Escape routes from or across the installations
- c. The location and quantity of hazardous substances under storage or being used or processed should be indicated or superimposed on the layout plan as shown in Figure 3.

**Figure 3 :** Illustration of Locations and Quantity of Hazardous Substances



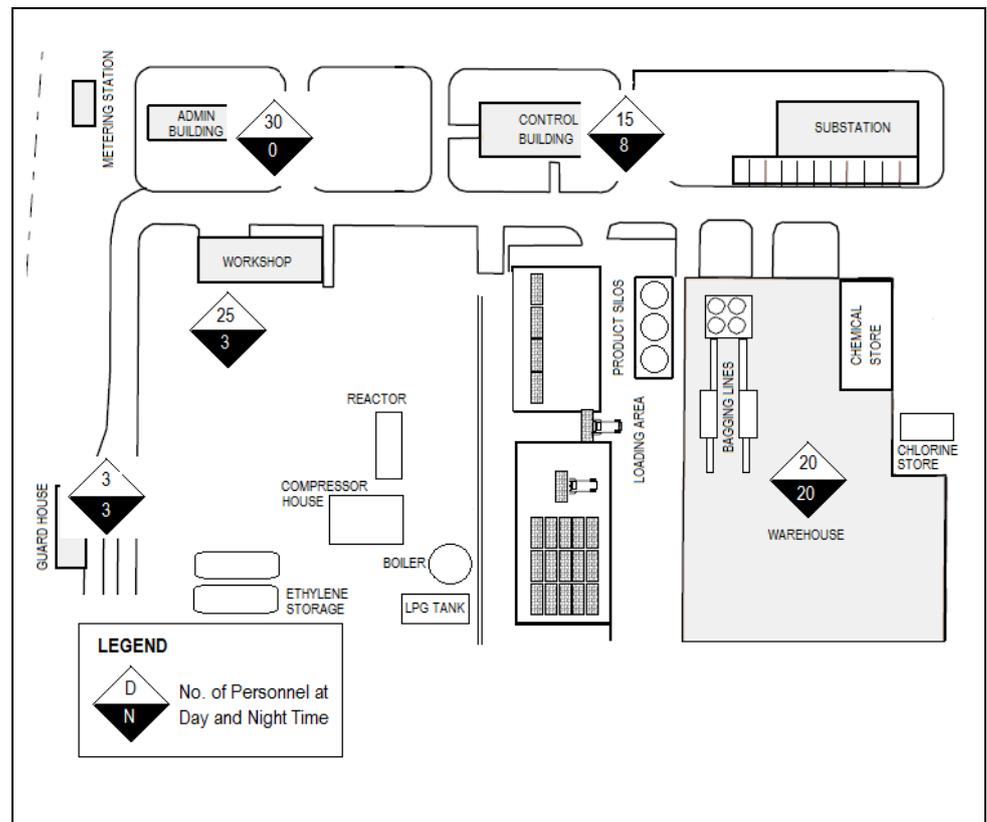
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<p><b>B.3</b></p> <p><i>A description of the process or storage involving the hazardous substances and an indication of the conditions under which it is normally held</i></p> <p><b>Schedule 6(b)(iii)</b></p>	<p>a. General description should be given on the process and/or storage activities involving the hazardous substances; and should include the process chemistry (if applicable)</p> <p>b. Simplified process flow diagram (PFD) should be included describing the main operations rather than detailing every single stage and activity in the operation. Inventories, flow, temperature and pressure and physical state of the process fluids or products should be indicated on the PFD.</p> <p>Depending on the confidentiality nature of the information, detailed Process and Instrumentation Diagram (P&amp;ID) may be included.</p> <p>c. General process description and operation of other utility and support facilities such as drainage/sewerage system, wastewater treatment plant, plant/instrument air or steam generation including safety and fire protection system should be included</p>
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<p><b>B.4</b></p> <p><i>The maximum number of person likely to be present on site</i></p> <p><b>Schedule 6(b)(iv)</b></p>	<p>a. The maximum number of people (including contractors, delivery drivers and office staff) who may be present during the day and night time and should be presented in a table and, if possible, illustrated on the plant layout or map as shown in Figure 4 and 5 below.</p> <p><b>Figure 4 : Maximum Number of Personnel at Day and Night Time</b></p> <table border="1"> <thead> <tr> <th rowspan="2"><i>Location</i></th> <th colspan="2"><i>No. of personnel</i></th> </tr> <tr> <th><i>Day</i></th> <th><i>Night</i></th> </tr> </thead> <tbody> <tr> <td><i>Administration Building, manning various departments : Technical Services, Human Resources; HS, Finance &amp; Logistics</i></td> <td>30</td> <td>-</td> </tr> <tr> <td><i>Warehouse</i></td> <td>20</td> <td>2</td> </tr> <tr> <td><i>Workshop</i></td> <td>25</td> <td>3</td> </tr> <tr> <td><i>Laboratory</i></td> <td>32</td> <td>7</td> </tr> <tr> <td><i>Central Control Building</i></td> <td>15</td> <td>8</td> </tr> <tr> <td><i>Security Guard House</i></td> <td>3</td> <td>3</td> </tr> </tbody> </table>	<i>Location</i>	<i>No. of personnel</i>		<i>Day</i>	<i>Night</i>	<i>Administration Building, manning various departments : Technical Services, Human Resources; HS, Finance &amp; Logistics</i>	30	-	<i>Warehouse</i>	20	2	<i>Workshop</i>	25	3	<i>Laboratory</i>	32	7	<i>Central Control Building</i>	15	8	<i>Security Guard House</i>	3	3
<i>Location</i>	<i>No. of personnel</i>																							
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<i>Laboratory</i>	32	7																						
<i>Central Control Building</i>	15	8																						
<i>Security Guard House</i>	3	3																						

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**Figure 5 : Tabulation of Personnel at Day and Night Time**



b. In addition to manning level during normal operation, typical manning conditions during special situations such as major project or plant turnaround should also be specified to indicate the increased number of personnel onsite and exposure to risks from major accidents.

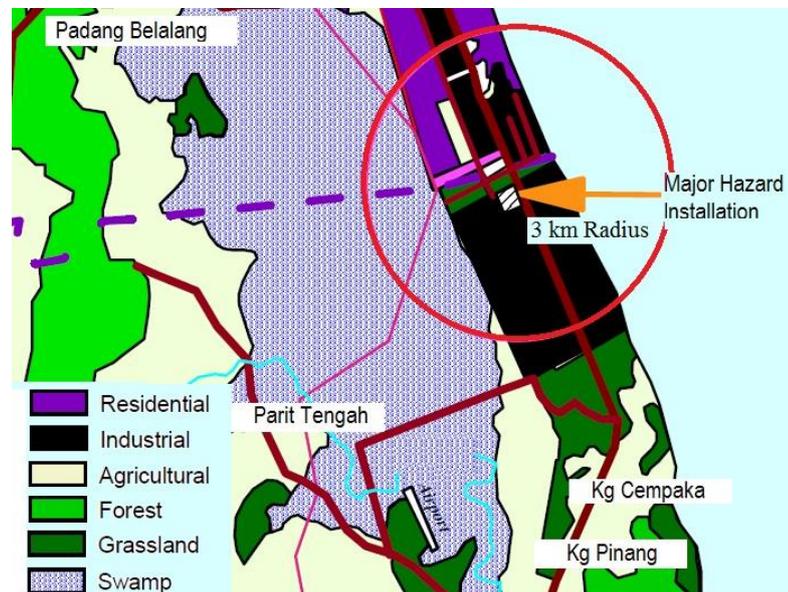
**B.5**

*Information about the nature of the land use and the size and distribution of the population in the vicinity of the industrial activity to which the report relates*

**Schedule 6(b)(v)**

- a. Natural environment and surroundings of the installation such as the land use and distribution or personnel in the vicinity should be discussed and illustrated on a site map shown in Figure 6, covering areas and distance appropriate to the nature and potential impact of major accident from/to the location. The following should be included in the map
- Inhabited areas e.g. description of the areas including population densities
  - Establishments receiving the public, meeting points (regular or occasional)
  - Sensitive public buildings e.g. schools, hospitals, churches, police stations, fire stations, telephone switchboards etc.
  - Conservation areas, registered monuments and areas of tourist attraction
  - Public utilities, possibly affected by accident consequences, in the vicinity e.g. electricity, gas, telephone, water, sewers and treatment plant etc
  - Distribution of offsite population during day and night time based on available source or estimation, example as shown in Figure 7.

**Figure 6 : Land Use**



**Figure 7 : Distribution of Population**

<i>Surrounding Settlement</i>	<i>Day</i>	<i>Night</i>
<i>Kampung Cempaka</i>	500	1000
<i>Kampung Pinang</i>	150	200
<i>Parit Tengah</i>	160	313
<i>Kg Padang Belalang</i>	200	430

- b. Any external activities and developments e.g. nearby installations, airport operations etc that may become potential sources of hazards to the installation should be shown in the map.

**B.6**

*Information on the nearest emergency services (fire station, hospital, police station, community hall etc)*

**Schedule 6(b)(vi)**

- a. This section should contain information on nearest emergency services such as fire department, police, hospital, clinic, marine department and others who may be required to response and provide assistance in case of major accidents occurring at the installation. Details of the emergency services can be tabulated as per Figure 7 and should contain the following minimum information
- Location
  - Distance from the installation
  - Estimated time taken to arrive at site
  - Expertise or type of services provided (fire fighting, medical services, HAZMAT response etc)

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<b>Figure 7 : Nearest Emergency Services</b>			
<i>Emergency Services</i>	<i>Distance (km)</i>	<i>Estimated Arrival Time (min)</i>	<i>Type of Services</i>
<i>Fire Station</i>	<i>1</i>	<i>&lt;1</i>	<ul style="list-style-type: none"> <li>• <i>Fire-fighting</i></li> <li>• <i>HAZMAT Response</i></li> <li>• <i>Search and Rescue</i></li> </ul>
<i>Poliklinik Jaya</i>	<i>10</i>	<i>7.5</i>	<ul style="list-style-type: none"> <li>• <i>Medical services</i></li> </ul>
<i>District Hospital</i>	<i>7</i>	<i>5.25</i>	<ul style="list-style-type: none"> <li>• <i>Ambulance</i></li> <li>• <i>Medical services</i></li> </ul>
<i>Polis Station, Taman Cempaka</i>	<i>10</i>	<i>7.5</i>	<ul style="list-style-type: none"> <li>• <i>Crourd control</i></li> <li>• <i>Security</i></li> </ul>

<b>Part C</b> <b>Schedule 6 (c) : Information Relating to the Management System</b>
<p><b>GUIDANCE</b></p> <p>Introductory part of this section should describe about management system framework put in place such as the health, safety and environment management system (HSEMS), OHSAS 18001 or other management system that defines and implements the safety policy. Detailed description on specific elements is described in the subsections</p>

<p><b>C.1</b></p> <p><i>The staffing arrangements for controlling the industrial activity with the name of the person responsible for safety on the site and the names of those who are authorised to set emergency procedures in motion and to inform outside authorities</i></p> <p><b>Schedule 6(c)(i)</b></p>	<p>a. This section should discuss the following:</p> <ul style="list-style-type: none"> <li>▪ Organisation structure from the top down to the first line supervisory level describing the roles and responsibilities on safety, including the name of personnel and position responsible for safety on the site. The organisation chart should be included</li> <li>▪ Safety organisation or function in the forms of <ul style="list-style-type: none"> <li>– Site Health and Safety Committee</li> <li>– Health and Safety Department, Section or Function</li> </ul> </li> <li>▪ Emergency response organisations and the name of personnel and position authorized to <ul style="list-style-type: none"> <li>– activate emergency response</li> <li>– inform outside authorities of emergency situation</li> </ul> </li> <li>▪ System or arrangement for determining and maintaining minimum staff level under all foreseeable operating conditions. These may include <ul style="list-style-type: none"> <li>– Management of Change (MOC) process on organisational changes to ensure availability of competent personnel for operation</li> </ul> </li> </ul>
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	<ul style="list-style-type: none"> <li>– General reference concerning coverage for key personnel e.g. plant manager etc in their absence</li> <li>– Implementation of duty roster to ensure adequate coverage during silent hour through by duty manager, if any</li> </ul> <p>b. A tabulation of manning / manpower level by department, trade, job function or other categories should be included as appropriate</p>
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<p><b>C.2</b></p> <p><i>The arrangement made to ensure that the means provided for the safe operation of the industrial activity are properly designed, constructed, tested, operated, inspected and maintained</i></p> <p><b>Schedule 6(c)(ii)</b></p>	<p>a. This section should describe the whole range of management systems or arrangements focusing on technical, human and organisational aspects within the organisation. The following should be discussed in sufficient detail; and relevant reference documents, procedures, roles and responsibilities should be described:</p> <ol style="list-style-type: none"> <li>1) Aspects related to design, construction and commissioning of the facilities including the codes and standards adopted and technology applied for the processes</li> <li>2) Safe systems of work such as permit-to-work (PTW), energy isolation, control of ignition sources and other safety procedures which are put in place to prevent major accidents.</li> <li>3) Established operational control procedures covering normal operation, start-up and shutdown as well as non-routine operations.</li> <li>4) Inspection, testing, corrective/preventive maintenance and other specific integrity management program such as risk-based inspection (RBI) for ensuring integrity of safety critical equipment or controls.</li> <li>5) Safety audit and inspection programs</li> <li>6) Management of change (MOC) on the plant facilities or equipment, organisations and procedures</li> <li>7) Incident reporting, investigation and sharing of lessons learnt</li> <li>8) Hazards identification and risk assessment e.g. job hazards analysis, HAZOP and other risk assessment studies. Approaches or tools used and mechanism for monitoring and closure of the action items should be described. Examples of risk assessment reports and progress update of action items can be included as an attachment or appendix</li> <li>9) Arrangement for safety reviews or studies undertaken prior to execution of critical tasks e.g. pre-startup safety review</li> <li>10) Management of contractors in terms of the selection process and performance monitoring during work execution. Aspects related to training and communication for contractors should be described</li> <li>11) General description on emergency preparedness and response measures by making reference to specific emergency response plan (ERP) document. Details of the ERP should be discussed Schedule 6(d)(ii)</li> <li>12) Implementation of other program or initiatives e.g. ISO Certification, Behavioural Safety Program, Human Factor program etc</li> </ol>
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	<p>13) Arrangement for employee participations on HSE such as HSE promotion or campaign, safety observation program and means for obtaining employee feedback through complain/suggestion scheme, if available</p> <p>14) Safety performance monitoring and measurement (e.g. safety leading and lagging KPIs, process safety metrics)</p> <p>15) Document management control. This includes arrangement for control of process safety information such as P&amp;ID, technical drawings, equipment specification or datasheet, risk assessment reports etc to ensure they are up-to-date, available and accessible. Description on the development, review, update and communication processes should be included. Detailed list of the procedures or instructions can be included in the attachment if necessary.</p> <p>b. Reference can be made to specific process safety or technical integrity management program, if available.</p>
<p><b>C.3</b></p> <p><i>The arrangement for training of persons working on the site</i></p> <p><b>Schedule 6(c)(iii)</b></p>	<p>This section describes the training requirements for personnel and how training needs are identified and implemented for all levels of staff including the management personnel, technical staff and contractors. Details should be given on the following</p> <p>a. Mechanism or process for identification of training needs e.g. based on critical task analysis, staff appraisal or supervisor identification.</p> <p>The discussion should not be limited to safety training, but should also cover other functional training required to ensure competency of personnel in their respective work areas</p> <p>b. Various type or format of training program in place such as follows</p> <ul style="list-style-type: none"> <li>▪ Safety briefing</li> <li>▪ Induction of new recruits</li> <li>▪ Skill development training for specific functions or trades</li> <li>▪ Supervisory development program</li> <li>▪ On-the-job training</li> <li>▪ Safety awareness and promotional program</li> <li>▪ Emergency exercise or drill</li> </ul> <p>c. Minimum training requirements established for various positions or functions, if possible, presented in the form of training matrix</p> <p>d. Testing or competency assessment take place to ensure effectiveness of the training</p> <p>e. Types of training record exist and how they are kept</p>

## Part D Schedule 6 (d) : Information relating to the Potential Major Accidents

### GUIDANCE

This section applies to the evaluation of the specific major accidents on the plant under consideration, focusing on the following

- Identification of representative release cases
- Estimation of the potential impact to the plant in terms of risk to those who work on the site or who work or live off the site
- Risk mitigation measures

### D.1

*A description of the potential sources of major accident and conditions or events which could be significant in giving rise to one*

#### Schedule 6(d)(i)

- a. A qualitative hazard identification and risk assessment method can be used for identification of potential sources of major accident related to hazardous substances and the effects. The following should be used as guidance:

#### 1. Determination of Qualifying Substances

All hazardous substances listed in Part A.1 should be considered as potential source of a major accident.

#### 2. Selection of Representative Release Cases

This involve identification of hazard sources i.e. the conditions and events which threaten the safe operation of the equipment, installation or plant in all phases of operation (start-up, normal operation, shut-down, loading/unloading etc). Examples of initiating events for catastrophic release may include, but not limited to the following:

- Mis-operation during loading and unloading operations
- Overfilling
- Extreme operating parameters e.g. over pressure, temperature
- Potential for internal explosion
- Equipment failure e.g. hoses, pipes etc due to substandard material, corrosion or erosion
- Failure of connections
- Brittle fractures
- Vapour breakthrough
- External events, where relevant, such as aircraft impacts, earthquake, forest fires, flood, lightning and extreme environmental conditions

Blast overpressure, thermal radiation or missile impact may result in escalation and knock-ons such as further releases, which themselves could cause greater harm than the initial event. Ideally such scenarios should be identified and addressed.

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## 3. Consequence Analysis

In discussing the potential release scenario and the consequence, the estimation of probability of each accident scenario and the severity may be described quantitatively or qualitatively using risk matrix or other criteria. The extent and severity of the consequence for the different types of events should be determined along with the number of people and/or environment who/which will be exposed to the hazard.

The catastrophic release case should be based on the maximum quantity of most hazardous isolatable inventory before isolation (i.e. without safeguards or control measures) and, if applicable, should include most hazardous adjacent isolatable inventory.

For smaller releases (e.g. 13mm, 25mm, 50mm holes), the release duration will be determined by the time to isolate and the section to depressurise.

Depending on the type of hazardous substances being dealt with, the following types of events may be considered:

- Flammable releases leading to pool fire, jet flame, BLEVE, flash fire or vapour cloud explosion (in the case of delayed ignition of flammable gas releases)
- Toxic release
- Missile effects i.e. catastrophic failure leading to vessel fragments being projected over large distances, with the potential to cause damage to other plant or building including surrounding population

In order to visualise the impacts of a fire, explosion or toxic release, it is necessary to determine the levels of radiation heat flux, explosion overpressure or airborne concentration that will probably cause fatalities or damages. The threshold values for fire and explosion hazard are expressed in terms of thermal radiation and overpressure effects, whilst toxic dispersion hazard is expressed in terms of Occupational exposure limit values. The impact of fire or explosion to human being and property are normally based on the resultant heat flux and explosion overpressure shown in the following table :

Hazard Type	Hazard Criteria	Effects on Human	Effects on Property
Fireball/Jet Fire /Pool Fire	Heat Flux		
	4 kW/m <sup>2</sup>	Thermal radiation limit below which fatalities are unlikely	No damage
	12.5 kW/m <sup>2</sup>	Significant injury	Minimum energy required for piloted ignition of wood, melting of plastic tubing.
	37.5 Kw/m <sup>2</sup>	100% fatality probability for a 30 second exposure	Failure of steel structures within 30 minutes.
Explosion / Over-pressure	Explosion overpressure:		
	0.5 psi	No fatalities	Minor Damage (windows broken)
	2.0 psi	20% Fatalities	Moderate damage (pipe deformation)
	5.0 psi	50% Fatalities	Heavy damage

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Occupational exposure limits and standards are guidelines to industry to protect health of workers, usually from the effects of chronic exposure over their working lifetime. They are not intended for the general public, however can be used as indication on the risk of exposure to the public when used in toxic dispersion modelling. The detailed of the toxic exposure limits are discuss below:

- **IDLH** (Immediate Danger to Life and Health) – It is specifically refers the acute respiratory exposure that poses an immediate threat of loss of life, immediate or delayed irreversible adverse effects on health, or acute eye exposure that would prevent escape from hazardous atmosphere. This is based on American Conference of Governmental Industrial Hygienist (ACGIH).
  - **ERPG 2** (Emergency Response Planning Guideline) – The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual’s ability to take protection action.
  - **TLV** (Threshold Limit Value) – Represent conditions under which nearly all workers may be exposed repeatedly during 8 hours working day without adverse health effects.
- b. The summary of potential source of major accidents can be presented in the form of a hazards and effect register or risk register as shown in Figure 8 containing the following minimum information
1. Location (Facility/Equipment)
  2. Hazardous substances
  3. Hazard Event
  4. Potential Major Accident involving or resulting from catastrophic release of hazardous substances

**Figure 8 :** Examples of Potential Sources of Major Accidents

<i>Location</i>	<i>Hazardous Substance</i>	<i>Hazard Event</i> <i>(Conditions leading to major accident)</i>	<i>Potential Major Accident</i>
<i>Waste Heat Boiler System</i>	<i>LPG</i>	<i>Joint Failure</i>	<i>Major fire/explosion due to release of flammable gas</i>
	<i>Ammonia</i>	<i>Release from PSV</i>	<i>Toxic effect to surrounding due to release of toxic gas</i>

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<p><b>D.2</b></p> <p><i>A diagram of the plant in which the industrial activity is carried on sufficient to show the features which are significant as regards the potential for a major accident or its prevention or control</i></p> <p><b>Schedule 6(d)(ii)</b></p>	<p>This section should include</p> <p>a. Descriptions and diagram(s) containing the following information :</p> <ul style="list-style-type: none"> <li>• Location of potential major accidents covered in Section D.1</li> <li>• Extent of impacts of identified major accidents indicated on the plant layout or map</li> </ul> <p>b. Description on emergency control systems such as firewater system network, fire and gas detectors, assembly areas and temporary refuges.</p>
<p><b>D.3</b></p> <p><i>A description of the measures taken to prevent, control or minimise the consequences of a major accident</i></p> <p><b>Schedule 6(d)(iii)</b></p>	<p>This section should describe arrangement for prevention, control and mitigation measures. The following should be addressed:</p> <p>a. Application of inherent safety concept in the design, construction and operation through elimination, minimisation, substitution, segregation/isolation etc to manage hazardous substances at source.</p> <ul style="list-style-type: none"> <li>▪ Segregation or isolation of hazardous substances e.g. provision of dedicated storage facilities to ensure adequate safety distance and separation from reactive or incompatible substances etc</li> <li>▪ Minimization of inventory e.g. batch delivery vs onsite storage</li> <li>▪ Design and construction aspects addressing material and chemical reactivity/compatibility for containers, process piping and other process equipment</li> <li>▪ Hazardous area classification</li> </ul> <p>b. Engineering measures put in place to prevent, control or mitigate the impacts of major accidents and control of runaway reactions in the forms of relevant hardware barriers as follows :</p> <ol style="list-style-type: none"> <li>1) <b>Structural Integrity</b> e.g. foundation and structures to withstand against vibration, overload, stress etc due to abnormal operating conditions or weather such as overspeed, overpressure, earthquake and strong wind</li> <li>2) <b>Process Containment</b> e.g. gas tight floor, vessel, tank, secondary spill containment</li> <li>3) <b>Ignition Control</b> e.g. inert gas system, purge gas system, certified electrical equipment, earthing/bonding, ventilation and miscellaneous ignition control system</li> <li>4) <b>Protection System</b> e.g. deluge/sprinkler, firewater system, foam system, fire suppression system, passive fire protection and other devices for limiting the size of accidental releases such as scrubbing systems, water spray including means for prevention of run-away reactions</li> </ol>

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- 5) **Detection System** e.g. fire and gas detection and alarm system, analysers for impurities/contaminants
- 6) **Depressurisation and Shutdown System** e.g. emergency venting and depressurisation system, ESD, emergency shut-of valves, pipeline isolation,
- 7) **Emergency Response** e.g. communication system, emergency power supply, evacuation route and assembly point, portable fire-fighting equipment, open and close drain system, temporary refuge
- 8) **Lifesaving** e.g. personal protective equipment, emergency shower/eyewash and other personal survival equipment

In identifying the prevention, control or mitigation measures, a structured hazards and effects management process such HAZID, bowtie analysis or other appropriate methods could be used and presented in a table such as shown in Figure 9.

**Figure 9** : Hazards and Effect Prevention, Control and Mitigation

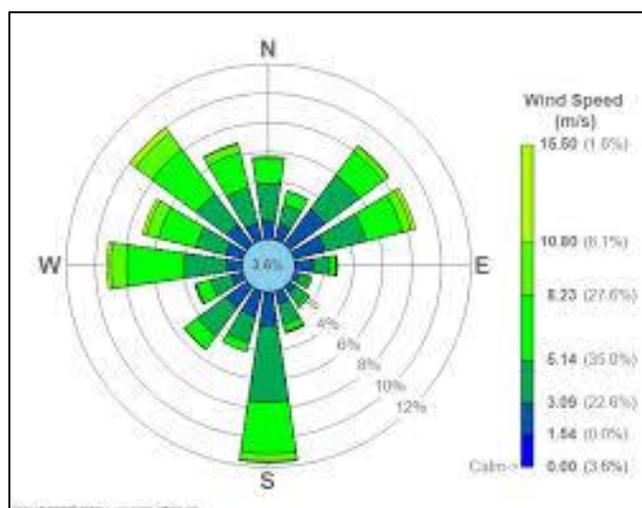
<b>System/Equipment : WASTE HEAT BOILER (08-E001A)</b>				
<b>Hazard Event</b>	<b>Threat, Cause or Initiating Event</b>	<b>Effect/Consequence</b>	<b>Preventative Measures</b>	<b>Control/Mitigations</b>
<i>LPG release due to Joint Failure</i>	<i>Bolt relaxation</i>	<i>Minor leak (5mm), leading to major leaks and fire</i>	<i>Management of critical joints</i>	<i>Online repair procedures</i>  <i>Gas detectors</i>
<i>Ammonia release from PSV (Safety valve SV 0809 set at 366 bar)</i>	<i>Overpressure</i>	<i>Toxic effects to surrounding population</i>  <i>Release to atmosphere, leading to fire</i>	<i>Pressure alarm PRAH 07030</i>  <i>Periodic testing of PSV (every 3 months)</i>	<i>PSV vented at safe location</i>  <i>Increase purge by opening HIC-08007 to reduce loop pressure</i>  <i>Reduce load/compressor speed, if necessary</i>

The information on prevention, control or mitigation should link or correspond to the specific release cases discussed in Part D.1. The principle of ALARA (As Low As Reasonably Achievable) should be used in determining the level of preventive measures and controls required.

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	<p>c. System or arrangement for the management of barriers to ensure functionality and reliability of the items. This includes description on inspection, testing and maintenance programs. Specific integrity management program or measure for identification of safety critical equipment, critical activities, positions or functions, and the performance standards should be included.</p> <p>d. Description on emergency preparedness and response measures covering the following</p> <ul style="list-style-type: none"> <li>▪ Details on emergency response plan (ERP) <ul style="list-style-type: none"> <li>– Procedures and plans</li> <li>– Types and levels of emergency</li> <li>– Emergency organisations, roles and responsibilities</li> <li>– Emergency communication to internal and external parties, including description on automatic means of communication to fire services authority, if any</li> <li>– Head count</li> <li>– Training, drill and exercises</li> <li>– Medical services</li> <li>– Mutual aid agreement with external parties</li> </ul> </li> <li>▪ Emergency response facilities <ul style="list-style-type: none"> <li>– Personal protective equipment (PPE), escape sets</li> <li>– Toxic release shelter</li> <li>– Arrangement for inspection, testing and maintenance of emergency facilities</li> </ul> </li> <li>▪ Samples of pre-incident action plan related to major incidents involving hazardous substances should be included</li> </ul>
<p><b>D.4</b></p> <p><i>Information about the prevailing meteorological conditions in the vicinity of site</i></p> <p><b>Schedule 6(d)(iv)</b></p>	<p>a. As the environment conditions may present potential hazard sources, influence the development of an accident at the installation, and be affected by the consequences of an accident, data will be needed for the description of the relevant environmental factors. Such meteorological data includes:</p> <ul style="list-style-type: none"> <li>– Average and maximum indices on precipitation (rain, hail)</li> <li>– Lightning, thunderstorms</li> <li>– Temperature</li> <li>– Humidity, fog, frost</li> <li>– Winds (direction, speed)</li> <li>– Stability classes</li> <li>– Maximum and minimum recorded temperatures</li> </ul> <p>b. Wind data should be presented in the form of Wind-Rose such as shown in Figure 10.</p>

## Format and Contents of CIMAH Report

**Figure 10 : Wind Speed and Direction**

- c. Meteorological information should be based on published data from nearby meteorological monitoring station.

**D.5**

*An estimate of the number of people on-site and off-site who may be exposed to the hazards considered in the report*

**Schedule 6(d)(v)**

- a. Number of personnel onsite and offsite who may be exposed to or affected by major accidents listed in Part D.1 should be indicated in this section. The information should be based on consequence analysis results without considering the likelihood of the event.
- b. The information can be presented in the form of a table as shown in Figure 11, describing the incident scenario, number of personnel affected by the accident and the distance from the accident location.

**Figure 11 : Number of Personnel Likely to be Affected by Major Accidents**

Major Accident Scenario	Distance (m)	Area	Population	
			Day	Night
<b>Exposure to Thermal Radiation &gt; 37.5 kW/m<sup>2</sup></b>				
Jet fire from release of flammable gas (LPG)	169	Onsite	2	1
		Plant ABC	12	5
		Padang Temu	45	60
Flash Fire from Release of Flammable Gas (LPG)	275	Onsite	2	1
		Plant ABC	12	5
		Padang Temu	45	60
		Solok Papan	12	20
<b>Exposure to Toxic Level &gt; IDLH</b>				
Toxic Release of Ammonia	3500	Onsite	2	1
		Plant ABC	12	5
		Padang Temu	45	60
		Solok Papan	12	20
		Kg Cempaka	30	50

## Format and Contents of CIMAH Report

**D.6**

*The consequence to the surrounding areas in the form of appropriate risk measures where possible*

**Schedule 6(d)(vi)**

- a. This section shall describe the impact of all the accident scenarios to the environment which includes human, flora, fauna and aquatic life. Please take note that the discussion on the impact is quite general as the actual impact depends on factors such as concentration, exposure times, species and tolerability.
- b. As minimum, results from consequence analysis discussed Part D.1 as per Schedule 6(d)(i) should be used to indicate the extent of impact in terms of location/distance and severity e.g. who (people) or what (environment) might be harmed, how badly, and how many (people) or how much (environment) are affected by major accident.

Established or reliable consequence modelling technique should be used.

Description on the release scenario, assumptions, environmental data, reference standards, theoretical formula and the results should be summarized in this section. The information can be presented in a table as shown in Figure 12. For better illustration, it is recommended that the impact contours are indicated on the plant layout or map.

**Figure 12** : Consequence to the Surrounding Likely to be Affected by Major Accidents

<i>Scenario</i>	<i>Hazardous Substances</i>	<i>Location</i>	<i>Thermal Radiation (kW/m<sup>2</sup>)</i>	<i>Affected Distance (m)</i>	<i>Affected Area</i>
<i>Pool Fire</i>	<i>Methanol</i>	<i>T-1101</i>	<i>4.0</i>	<i>212</i>	<i>Tank area</i>
			<i>12.5</i>	<i>106</i>	<i>Tank area</i>
			<i>37.5</i>	<i>0</i>	<i>Tank area</i>
<i>Jet Fire</i>	<i>Methanol</i>	<i>X-1111</i>	<i>4.0</i>	<i>169</i>	<i>Jetty</i>
			<i>12.5</i>	<i>141</i>	<i>Jetty</i>
			<i>37.5</i>	<i>123</i>	<i>Jetty</i>
<i>Flash Fire</i>	<i>Methanol</i>	<i>T-1101</i>	<i>4.0</i>	<i>313</i>	<i>Tank area</i>
			<i>12.5</i>	<i>281</i>	<i>Tank area</i>
			<i>37.5</i>	<i>275</i>	<i>Tank area</i>
<i>Scenario</i>	<i>Hazardous Substance</i>	<i>Location</i>	<i>Toxic Level (ppm)</i>	<i>Affected Distance (m)</i>	<i>Affected Area</i>
<i>Toxic Release</i>	<i>Chlorine</i>	<i>Unit 650</i>	<i>30</i>	<i>3500</i>	<i>Process area, Jetty, Tank, Plant ABC, Padang Temu, Solok Papan, Kg Cempaka</i>
			<i>60</i>	<i>1000</i>	<i>Process area, Jetty, Tank, Plant ABC,</i>
			<i>1,000</i>	<i>500</i>	<i>Process area, Tank area</i>

- c. Where a quantitative risk assessment (QRA) has been conducted, information on societal risks in the forms of Location Specific Individual Risk (LSIR) iso-risk contours or F-N curves can be included in the report and compared with available risk acceptance criteria e.g. a fatality risk level of “1 in a million per year” or (1 x 10<sup>-6</sup>) for residential area.

The source of the above information e.g. QRA report should be indicated and relevant charts or diagrams such as the risk contours should be included.

## Format and Contents of CIMAH Report

	<p>d. Plant responsibility toward the community during emergency as well as during normal operation should be described. This includes discussion on the means of communication and process undertaken by the Facility Owner</p> <ul style="list-style-type: none"><li>▪ During Major Emergency: Information about the major incident that had happened and recommended actions that the local authority and members of the local community should take to eliminate or minimise risks to health and safety.</li><li>▪ During Normal Operation: Information about hazards and potential major incident that may occur; and the name, position and contact details of a person from whom the information may be obtained.</li></ul>
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## Summary Findings

Example of Completed Form with Hypothetical Information (For illustration purposes only)

**RINGKASAN PENEMUAN PEMATUHAN KEPADA  
JADUAL 6, SUBPERATURAN 14(1), PERATURAN-PERATURAN KESELAMATAN DAN  
KESIHATAN PEKERJAAN (KAWALAN TERHADAP BAHAYA KEMALANGAN BESAR DALAM  
PERINDUSTRIAN) 1996**

Nama Pemasangan : ABC Sdn Bhd

Alamat Pemasangan :

No. Rujukan JKPP :

BAHAGIAN	NO	PERKARA	PENEMUAN
A. Maklumat Berkaitan Bahan Berbahaya	i	Nama Bahan Berbahaya	Bahan Berbahaya yang disimpan atau digunakan adalah gas dan larutan Ammonia, Klorin dan Gas Asli.  Rujuk Seksyen A.1
	ii	Kaedah Analitis atau Kesusteraan Saintifik	Kaedah analitis ketulenan bahan berbahaya dilakukan melalui analisa makmal dan alat pengesanan seperti berikut: <ul style="list-style-type: none"> <li>▪ Kandungan Air - <i>Laboratory Test</i></li> <li>▪ Besi (<i>iron</i>) – <i>APHA Test Method</i></li> <li>▪ Minyak – <i>Infrared Spectrometric Method</i></li> <li>▪ Gas Hidrogen, Nitrogen Argon, Karbon Monoksida dan Methana - <i>Gas Chromatography</i></li> <li>▪ Oksigen – <i>Trace Oxygen Analyzer</i></li> <li>▪ Ammonia - <i>Draeger Method and Field Gas Detectors</i></li> <li>▪ Gas Toksik dan Mudah Terbakar - <i>Field Gas Detectors</i></li> </ul> Rujuk Seksyen A.2
	iii	Bahaya Yang Boleh Diwujudkan Oleh Bahan Berbahaya	Pelepasan gas toksik ( <i>toxic gas release</i> ) melibatkan ammonia dan klorin.  Rujuk Seksyen A.3
	iv	Darjah Ketulenan Bahan Berbahaya	Kandungan air dan oksigen yang tinggi boleh menyebabkan <i>stress corrosion cracking</i> pada peralatan pemprosesan seperti tangki atau paip yang diperbuat daripada <i>carbon steel</i> . Darjah ketulenan ammonia dikekalkan pada paras melebihi 99.5%

## Summary Findings

Example of Completed Form with Hypothetical Information (For illustration purposes only)

			Rujuk Seksyen A.4.2
B. Maklumat Berkaitan Pemasangan	i	Peta Tapak dan Kawasan Persekitaran	Pelan tapak Loji ABC dan kawasan persekitaran ada dinyatakan pada Apendiks 2: Gambarajah 1.
	ii	Pelan Skala Tapak	Pelan tapak berskala ditunjukkan dalam Apendiks 2: Gambarajah 2.
	iii	Penerangan Proses atau Penyimpanan Bahan Berbahaya	<p>Aktiviti dan kemudahan pemprosesan adalah dalah seperti berikut.</p> <ul style="list-style-type: none"> <li>▪ <i>ABC Process Unit</i></li> <li>▪ <i>DEF Process Unit</i></li> <li>▪ <i>Storage and Loading Facilities</i></li> <li>▪ <i>Utility i.e. cooling water system, demineralization unit dan waste water treatment unit</i></li> </ul> <p>Sistem pengolahan bahan kumbahan (<i>effluent treatment system</i>) sedang dinaiktaraf dan ringkasan sistem tersebut dibincangkan dalam Seksysn B.3.3.5.</p> <p>Inventori dan kedudukan bahan-bahan berbahaya ditunjukkan dalam pelan tapak pada Apendiks 2: Gambarajah 2.</p>
	iv	Bilangan Maksima Orang di Tapak	Bilangan maksima pekerja adalah 434 orang pada waktu siang (pekerja pejabat dan shif). Taburan bilangan dan kedudukan orang di tapak ditunjukkan dalam pelan tapak pada Apendiks 2: Gambarajah 3A dan 3B.
	v	Penggunaan Tanah dan Taburan Penduduk di Sekitar Tapak Aktiviti Industri	<p>Kawasan di sekitar 2 km adalah kawasan industri yang merangkumi Pelabuhan XYZ, Loji Janakuasa TMB, Loji Petrokimia DEF dan kilang-kilang di Kawasan Perindustrian GHI .</p> <p>Kebanyakan penduduk luar tapak adalah pekerja di Pelabuhan XYZ (1224 orang), Loji Petrokimia DEF (1000 orang) dan Loji Janakuasa TMB (347 orang)..</p> <p>Rujuk Seksyen B.5.1</p>
	vi	Perkhidmatan Kecemasan	<p>Perkhidmatan kecemasan terdekat adalah Hospital Besar XYZ (5.5 km), Polis Di Raja Malaysia (8.4 km) dan BOMBA (10.6 km).</p> <p>Bantuan kecemasan boleh juga diperolehi daripada loji-loji berhampiran seperti yang kebanyakannya adalah ahli kumpulan XYZ Emergency Mutual Aid.</p>

## Summary Findings

Example of Completed Form with Hypothetical Information (For illustration purposes only)

C. Maklumat Berkaitan Sistem Pengurusan Keselamatan dan Kesihatan	i	Pengurusan Kakitangan	<p>Walaupun keselamatan adalah tanggungjawab bersama, semua peringkat pengurusan mempunyai tanggungjawab dan peranan masing-masing terhadap keselamatan (<i>line responsibility</i>).</p> <p>Pengarah Urusan syarikat memikul tanggungjawab tertinggi bagi memastikan operasi loji dijalankan dengan selamat.</p> <p>Jabatan Keselamatan, Kesihatan dan Alam Sekitar (HSE) berfungsi sebagai penasihat kepada pihak pengurusan tertinggi dalam hal berkaitan HSE. Jabatan HSE bertanggungjawab untuk menyediakan, mengurus dan melaksana sistem dan prosedur keselamatan syarikat.</p> <p>Organisasi terkini dimasukkan di dalam Apendiks 5.</p>
	ii	Pengurusan Operasi Selamat	<p>Di antara kaedah pengurusan operasi selamat bagi menghindar dan mengawal bahaya kemalangan besar adalah</p> <ul style="list-style-type: none"> <li>▪ Pelaksanaan sistem pengurusan keselamatan dan alam sekitar OHSAS 18001 an ISO 14001</li> <li>▪ Pelaksanaan <i>Process Safety Management (PSM)</i></li> <li>▪ Sistem mengawal perubahan / ubahsuai rekabentuk, peralatan dan prosedur operasi (<i>management of change</i>)</li> <li>▪ Sistem permit kerja (<i>permit to work</i>)</li> <li>▪ Sistem dan program penyelenggaraan</li> <li>▪ Penilaian bahaya (<i>hazard and effect management process</i>)</li> <li>▪ Program pemeriksaan dan audit</li> <li>▪ Prosedur melapur dan menyiasat kemalangan</li> <li>▪ Pelan tindakan kecemasan</li> <li>▪ Penggunaan alat pelindungan keselamatan diri (<i>personal protective equipment dan escape set</i>)</li> </ul> <p>Rujuk Seksyen C.2</p>
D. Maklumat Berkaitan Kemalangan Besar	i	Kemungkinan Punca Kemalangan Besar	<p>Kemalangan besar boleh berlaku jika gas ammonia terlepas ke udara dengan jumlah yang banyak dan tidak terkawal akibat. Di antara punca utama pelepasan gas adalah</p> <ul style="list-style-type: none"> <li>▪ Kerosakan pada bahagian penyambung (<i>joint failure</i>)</li> <li>▪ Kebocoran pada peralatan seperti tangki atau paip akibat kakisan (<i>corrosion</i>)</li> <li>▪ Kerosakan akibat bencana seperti kebakaran atau letupan</li> </ul>

## Summary Findings

Example of Completed Form with Hypothetical Information (For illustration purposes only)

			Rujuk Seksyen D.1.3
	ii	Gambarajah Loji Berkaitan Ciri Penting Kemungkinan Kemalangan Besar, Pencegahan atau Kawalan	Gambarajah kemudahan-kemudahan pencegahan atau kawalan ( <i>Gas Detection System</i> dan <i>Toxic Shelter</i> ) ditunjukkan dalam Apendiks 3: Gambarajah 3.
	iii	Langkah Mencegah, Mengawal atau Mengurangkan Akibat Kemalangan Besar	<p>Langkah-langkah mencegah, mengawal atau mengurangkan kesan kemalangan dibentangkan dalam Seksyen D.2.1. Di antaranya :</p> <ul style="list-style-type: none"> <li>▪ Aplikasi sistem keselamatan (<i>safeguarding system</i>)</li> <li>▪ Pengasingan bahan berbahaya dan tidak serasi (<i>incompatible</i>)</li> <li>▪ Sistem pembentungan tumpahan dan perparitan (<i>Spill Containment and Drainage System</i>)</li> <li>▪ Kawalan jumlah bahan berbahaya (<i>minimization of inventory</i>)</li> <li>▪ Pencegahan tindakbalas berantai (<i>runaway reaction</i>)</li> <li>▪ Mengawal <i>Stress Corrosion Cracking</i> pada peralatan pemprosesan</li> <li>▪ Klasifikasi kawasan merbahaya (<i>Hazardous Area Classification</i>)</li> <li>▪ Pelan tindakan kecemasan</li> </ul> <p>Peralatan penting dan kritikal (<i>Safety critical Element</i>) telah dikenalpasti melalui proses <i>Bowtie Analysis</i>. Program penyelenggaraan yang teratur telah dilaksanakan dengan mengambilkira <i>safety critical activities, safety critical positions</i> dan <i>performance standard</i>.</p>
	iv	Maklumat Kajiucua	Maklumat kajiucua berkaitan suhu, humiditi, hujan dan keadaan angin diperolehi daripada Jabatan Kajiucua Daerah. Data tersebut digunakan bagi meramal pergerakan dan kesan terhadap pelepasan gas toksik semasa kecemasan
	v	Bilangan Orang di Tapak atau Luar Tapak yang Mungkin Terlibat	<p>Bilangan orang di tapak yang terdedah dan mungkin terlibat dalam kemalangan besar di loji dianggarkan 784 orang (operasi biasa) atau 1434 orang (semasa <i>tumaround</i>)</p> <p>Rujuk Seksyen B.4.1 dan B.4.2</p>

## Summary Findings

Example of Completed Form with Hypothetical Information (For illustration purposes only)

			Bilangan orang di luar tapak yang terdedah dianggarkan 3000 orang  Rujuk Seksyen D.5.2
	vi	Akibat kepada Persekitaran Dalam Bentuk Langkah Risiko	Berdasarkan laporan <i>consequence modeling</i> yang dijalankan, pendedahan terhadap pelepasan gas ammonia pada paras 300 ppm (NIOSH <i>Immediate Danger to Life and Health</i> (IDLH)) tidak sampai kepada penduduk persekitaran.  Berdasarkan kepada Laporan QRA yang telah dijalankan, risiko terhadap penduduk persekitaran dalam bentuk <i>Individual Risk Contour</i> didapati berada pada paras yang dibenarkan iaitu di bawah $1 \times 10^{-6}$ fatality per year.  Rujuk Seksyen D.5 dan D.6

Berdasarkan kepada penemuan di atas, kami i) \_\_\_\_\_

Rujukan \_\_\_\_ dan ii) \_\_\_\_\_,

\_\_\_\_\_ mengesahkan telah mengambil kira terutamanya pengetahuan teknikal baru yang ketara memberi kesan kepada butiran dalam Laporan yang terdahulu yang berkaitan dengan keselamatan dan pemajuan dalam pengetahuan mengenai penilaian bahaya. Dengan itu mengesahkan bahawa : \*

- Tiada sebarang perubahan minor atau major yang menjejaskan Laporan Aktiviti terdahulu
- Ada perubahan minor. Tetapi tiada sebarang perubahan major yang menjejaskan Laporan Industri terdahulu
- Ada perubahan major yang menjejaskan Laporan Aktiviti Industri terdahulu

.....  
Nama Orang Kompeten : .....

Nombor OKMH: .....

Tarikh:

.....  
Name Pengilang : .....

Jawatan : .....

Tarikh:

## Declaration Letter

## LETTERHEAD SYARIKAT

DEKLARASI/AKUAN PENGILANG KE ATAS **LAPORAN MENGENAI AKTIVITI INDUSTRI** YANG DISEDIAKAN MENGIKUT PERATURAN 14 DAN 16 PERATURAN-PERATURAN KESELAMATAN DAN KESIHATAN PEKERJAAN (KAWALAN TERHADAP BAHAYA KEMALANGAN BESAR DALAM PERINDUSTRIAN) 1996

ADALAH SAYA \_\_\_\_\_ NAMA \_\_\_\_\_, SEBAGAI \_\_\_\_\_

DENGAN INI MENGAKU DAN MEMPERAKUKAN BAHAWA **LAPORAN MENGENAI AKTIVITI INDUSTRI** INI TELAH DISEDIAKAN OLEH PIHAK SAYA SELEPAS BERUNDING DENGAN ORANG KOMPETEN

IAITU \_\_\_\_\_, NO. PENDAFTARAN DENGAN JABATAN KESELAMATAN DAN KESIHATAN PEKERJAAN \_\_\_\_\_.

MAKA DENGAN INI, SAYA SEBAGAI PENGILANG MEMAHAMI ISI KANDUNGAN LAPORAN INI SEPENUHNYA DAN BERTANGGUNGJAWAB UNTUK MENGAMBIL TINDAKAN-TINDAKAN SEWAJARNYA MENGIKUT PERATURAN 5, PERATURAN-PERATURAN KESELAMATAN DAN KESIHATAN PEKERJAAN (KAWALAN TERHADAP BAHAYA KEMALANGAN BESAR DALAM PERINDUSTRIAN) 1996

SAYA JUGA MEMAHAMI BAHAWA, KEGAGALAN PIHAK SAYA MEMATUHI PERATURAN DI ATAS ADALAH SATU KESALAHAN DAN BOLEH DIKENAKAN DENDA SEHINGGA RM 50000 ATAU PENJARA TIDAK MELABIHI 2 TAHUN ATAU KEDUA-DUANYA SEKALI.

## TANDATANGAN &amp; COP PENGILANG

\_\_\_\_\_

TARIKH: \_\_\_\_\_

(NAMA: \_\_\_\_\_)

## TANDATANGAN ORANG KOMPETEN

\_\_\_\_\_

TARIKH: \_\_\_\_\_

(NAMA: \_\_\_\_\_)

NO. PENDAFTARAN: \_\_\_\_\_

## Declaration Letter

## LETTERHEAD SYARIKAT

DEKLARASI/AKUAN PENGILANG KE ATAS **PELAN KECEMASAN TAPAK** YANG DISEDIAKAN MENGIKUT PERATURAN 14 DAN 16 PERATURAN-PERATURAN KESELAMATAN DAN KESIHATAN PEKERJAAN (KAWALAN TERHADAP BAHAYA KEMALANGAN BESAR DALAM PERINDUSTRIAN) 1996

ADALAH SAYA \_\_\_\_\_ NAMA \_\_\_\_\_, SEBAGAI \_\_\_\_\_

DENGAN INI MENGAKU DAN MEMPERAKUKAN BAHAWA **PELAN KECEMASAN TAPAK** INI TELAH DISEDIAKAN OLEH PIHAK SAYA SELEPAS BERUNDING DENGAN ORANG KOMPETEN

IAITU \_\_\_\_\_, NO. PENDAFTARAN DENGAN JABATAN KESELAMATAN DAN KESIHATAN PEKERJAAN \_\_\_\_\_.

MAKA DENGAN INI, SAYA SEBAGAI PENGILANG MEMAHAMI ISI **KANDUNGAN PELAN KECEMASAN TAPAK** INI SEPENUHNYA DAN BERTANGGUNGJAWAB UNTUK MENGAMBIL TINDAKAN-TINDAKAN SEWAJARNYA MENGIKUT PELAN KECEMASAN TERSEBUT BERDASARKAN PERATURAN 18(2) DAN 18(2), PERATURAN-PERATURAN KESELAMATAN DAN KESIHATAN PEKERJAAN (KAWALAN TERHADAP BAHAYA KEMALANGAN BESAR DALAM PERINDUSTRIAN) 1996

SAYA JUGA MEMAHAMI BAHAWA, KEGAGALAN PIHAK SAYA MEMATUHI PERATURAN DI ATAS ADALAH SATU KESALAHAN DAN BOLEH DIKENAKAN DENDA SEHINGGA RM 50000 ATAU PENJARA TIDAK MELABIHI 2 TAHUN ATAU KEDUA-DUANYA SEKALI.

## TANDATANGAN &amp; COP PENGILANG

\_\_\_\_\_

TARIKH: \_\_\_\_\_

(NAMA: \_\_\_\_\_)

## TANDATANGAN ORANG KOMPETEN

\_\_\_\_\_

TARIKH: \_\_\_\_\_

(NAMA: \_\_\_\_\_)

NO. PENDAFTARAN: \_\_\_\_\_

## CIMAH Report Checklist

**SENARAI SEMAK****NAMA PEPASANGAN** : ABC Sdn Bhd**PERIHAL AKTIVITI** : Manufacture of ammonia and urea**KAPASITI BAHAN****BERBAHAYA** : Anhydrous Ammonia : 8636 Metric Tons

Ammonia Solution : 34 Metric Tons

Chlorine : 9.3 Metric Tons

Natural Gas : 70,000 m<sup>3</sup>/hr**RINGKASAN EKSEKUTIF** : Ikut Format / ~~Tak Ikut Format~~**RINGKASAN PENEMUAN:** Ikut Format / ~~Tak Ikut Format~~

No.	(a) Information Relating to Hazardous Substances	Yes	No	Comments (please specify pages)
1	Name of the hazardous substances as given in Schedule 2 or for a hazardous substance included in either of those Schedules under a general designation, the name corresponding to the chemical formula of the hazardous substance.	✓		Anhydrous Ammonia, Ammonia Solution, Chlorine and Natural Gas <b>Section A.1 (Page 2)</b>
2	Analytical Methods.	✓		Analytical methods using laboratory analysis and online detection systems <b>Section A.2 (Page 2 - 3)</b>
3	A brief description of the hazards which may be created by the hazardous substance.	✓		Health hazards due to exposure to toxic substances (ammonia and chlorine) and fire/explosion hazards due to flammable substance (natural gas) <b>Section A.4 (Page 3 – 12)</b>

## CIMAH Report Checklist

4	The degree of purity of the hazardous substance and the names of the main impurities and their percentages.	✓		Ammonia purity is maintained at 99.5%. Impurities may include water (<0.5%) and oil (<10 ppm) <b>Section A.4 (Page 12 – 14)</b>
5	Engineering control at site (Yes / No), if any, state:	✓		Engineering controls for prevention, control and minimization of hazards/risks <b>Section D.2.1 – D.2.3 (Page 12-59)</b>
<b>No.</b>	<b>(b) Information Relating to the Installation</b>	<b>Yes</b>	<b>No</b>	<b>Comments (please specify pages)</b>
1	A map of the site and its surrounding areas to a scale large enough to show any features that may be significant in the assessment of the hazard of risk associated with the site.	✓		XYZ District Locality Plan showing the site in relation to the surrounding area at a scale of 1:50,000 <b>Section B.1 (Page 2) Appendix 2 (Figure 1)</b>
2	Scale plan of the site showing the locations and quantities of all significant inventories of the hazardous substances.	✓		Master Plot Plan at a scale of approximately 1 : 1000 <b>Section B.2 (Page 2) Appendix 2 (Figure 2)</b>
3	A description of the processes or storage involving the hazardous substance and an indication of the conditions under which it is normally held.	✓		<b>Section B.3.2 (Page 3 – 22)</b>
4	An up-to-date process or activity flowchart diagram (PFD) or Piping and Instrumentation Diagram (P&ID)	✓		Process Flow Diagrams (PFD) for Ammonia Plant and Urea Plant <b>Appendix 4 (Figure 4.1) - Ammonia Appendix 4 (Figure 4.2) - Urea</b>
5	The maximum number of persons likely to be present on site	✓		Number of staff and contractors personnel during normal office hours and off-office hours <b>Section B.4 (Page 38-39)</b>
6	Information about the nature of the land use and the size and distribution of the population in the vicinity of the industrial activity to which the report relates.	✓		Nature of land use and population distribution within 5 kilometers radius <b>Section B.5.1 (Page 39-41)</b>
7	Other activities in the vicinity of the installation:	✓		Other major activities within 2 kilometers radius include <ul style="list-style-type: none"> <li>▪ Pelabuhan XYZ</li> <li>▪ Loji Janakuasa TMB</li> </ul>

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				<ul style="list-style-type: none"> <li>Loji Petrokimia DEF</li> </ul> <b>Section B.5.1 (Page 39-41)</b>
8	Information on the nearest emergency services (fire station, hospital, police station, community hall, etc).	✓		<b>Section B.3 (Page 41)</b>

No.	(c) Safety Management System	Yes	No	Comments (please specify pages)
1	The staffing arrangement for controlling the Industrial activity with the name of the person response for safety on the site and the names of those who are authorized to set emergency procedures in motion and to inform outside authorities :-	✓		<p>The Managing Director/Chief Executive Officer has the highest responsibility for safety on site and responsible for external notification to outside authorities</p> <p><b>Section C.7.3 (Page 22)</b></p> <p>The HSE Manager is responsible to provide specialist advice and guidance to the management team on areas of HSE authorized to set emergency procedures in motion and liaise with outside authorities.</p> <p><b>Section C.1 (Page 2 – 12)</b></p> <p>Specific names holding the above position are included in the Organization Chart</p> <p><b>(Appendix 5)</b></p>
	1.1 Safety Management System (Yes / No), if any, state	✓		<p>OHSAS 18001, ISO14001, Process Safety Management and specific safe systems of work e.g. PTW, Hazards and Effects Management Process, Management of Change</p> <p><b>Section C.2 (Page 12-33)</b></p>
	1.2 Clear site organization structure.	✓		<b>Appendix 5</b>
	1.3 Any particular or unusual expertise required to run plan safely.		✓	No particular/unusual expertise required for plant operations

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	1.4 General description of attributes appropriate to plant management and supervisory staff.	✓		Specific roles and responsibilities are included in <b>Section C.1.2 (Page 2 – 12)</b> .  Description of attributes e.g. experience, qualification, skill, behavior etc are not specifically described, however specified in the individual job/position description
	1.5 General reference concerning cover in the absence of plant manager etc.	✓		Coverage for external incident/emergency notification in the absence of MD/CEO is to be done by the most senior person available on site.  <b>Section C.2.7.3</b>
	1.6 Safety and Health Policy.	✓		Safety and Health Policy Statement is included in the Introduction  <b>Section 3.2 of Introduction</b>
	1.7 Established a system to audit and review activities and record accidents and near misses.	✓		Collect, analyze and maintain statistics on any accident <b>Section C.1.2.2 (Page 9), Section C.1.3 (Page 11)</b>  HSE Inspection and Audit <b>Section C.2.6 (Page 20 – 21)</b>  Incident Reporting <b>Section C.2.7 (Page 22)</b>
	1.8 Item relating to safety and health issues, action taken by the management to show care, through forums held between employers and employees such as Safety and Health Committee or other related forums.	✓		Safety awareness and promotional programs  <b>Section C.3.6 (Page 32)</b>
2	The arrangements made to ensure that the means provided for the safe operation of the industrial activity are properly designed, constructed tested, operated inspected and maintained :-			
	2.1 Design, fabrication and installation including their components, which comply with the certified standard. For example, pressure vessel, pipe work and other equipment which comply with standards or codes such as American Standard of Mechanical Engineering (ASME), British Standard (BS), American National Standard Institute (ANSI), etc.	✓		General statement on plant designs based on internationally recognised standards.  <b>Section C.2.3.3 (Page 15)</b>  Inspection engineering in accordance to ASME, API

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				<b>C.2.4.7 (Page 17-18)</b>
2.2	Scheduling or programming to ensure inspection and maintenance are carried out.	✓		Preventive Maintenance (time-based maintenance activities) <b>Section C.2.4.1 (Page 16)</b>
2.3	Identified critical equipment for inspection and maintenance such as pressure-relief system, temperature/pressure/flow sensor, preventing overflow system, emergency shut-down, utility, alarm.	✓		Risk Based Inpection <b>Section C.2.4.3 (Page 16 )</b> Identification of Safety and integrity Level (SIL) through Instrumented Protective Function (IPF) Study <b>Section C.2.4.4 (Page 17)</b>
2.4	Record keeping system for inspection and maintenance.	✓		SAP – Computerised Maintenance Management System <b>Section C.2.4.6 (Page 17)</b>
2.5	Establish clear procedure related to specific modification to the installation.	✓		QAI-GIA-017: Instruction For Executing Plant Modifications. <b>Section C.2.3.4 (Page 15)</b>
2.6	Information on qualified workers to perform modification works and clearly define their responsibility related to safety and health.	✓		Specific requirements and modification process e.g. risk assessment, personnel involved, are described in document QAI-GIA-017 as above <b>Section C.2.3.4 (Page 15)</b>
2.7	Identified critical equipment involve in modification.	✓		Modification of critical equipment e.g. instrument/electrical trip and alarm, measurement ranges, timer setting and relief valve settings are included in document QAI-GIA-017 as above and also covered under ISO 9001:2000 instruction QAI-GIA-001 <b>Section C.2.3.4 (Page 16)</b>

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	2.8 Record keeping system for modification.	✓		<b>Section C.2.3.4 (Page 16)</b>
	2.9 Established the Permit To Work (PTW) system such as hot work, confined space, electrical, excavation, etc	✓		<b>Section C.2.11 (Page 29 - 30)</b>
	2.10 Established an adequate system for selection, control and monitor contractor performance.	✓		Contractor management is done as per procedure QAP-SAFE-002 <b>Section C.3.7 (Page 32)</b> <b>Appendix 7.3</b>
	2.11 Established a system to report, investigate and record accidents and near misses.	✓		Incident Reporting and Investigation <b>Section C.2.7 (Page 22)</b>
	2.12 Established a system of safety inspection.	✓		HSE Inspection and Audit <b>Section C.2.6 (Page 20 – 21)</b>
3	The arrangements for training of persons working on the site			
	3.1 How training needs are identified.	✓		HSE Training Matrix <b>Section C.3.9 (Page 33)</b> <b>Appendix 7.5</b>
	3.2 How the training is carried out.	✓		Not specifically described in the report. Details on management of safety and functional training i.e. identification, execution, assessment and documentation are described in ABF HSE Training Manual <b>Section C.3.9 (Page 33)</b>
	3.3 What testing takes place to ensure that the training message has been received.	✓		As above
	3.4 What records exist of training being carried out.	✓		As above

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No.	(d) Information Relating to the Potential Major Accident.	Yes	No	Comments (please specify pages)
1	A description of the potential sources of a major accident and the conditions or events which could be significant in bringing one about.	✓		Accidental release of ammonia due to <ul style="list-style-type: none"> <li>- Failure of joint</li> <li>- Corrosions</li> <li>- Impacts from fires or explosions</li> </ul> <b>Section D.1.3 (Page 3)</b>
2	A diagram of the plant in which the industrial activity is carried on sufficient to show the features which are significant as regards the potential for a major accident or its prevention or control.	✓		Gas Detection System and Toxic Shelter facilities <b>Appendix 3 (Figure 3)</b>
3	A descriptions of the measures taken to prevent control or minimize the consequences of any major accident.	✓		Prevention, control or minimization of consequence through <ul style="list-style-type: none"> <li>- Safeguarding system</li> <li>- Segregation of incompatible substances</li> <li>- Spill containment and drainage system</li> <li>- Minimization of inventory</li> <li>- Prevention of runaway reaction</li> <li>- Control of stress corrosion</li> <li>- Hazardous area classification</li> <li>- ERP</li> </ul> <b>Section D.2.1 – D.2.3 (Page 12-59)</b>
4	The scenario of the incident; how the method of scenario selection	✓		<b>Section D.5.5 (Page 80)</b>
5	Information about prevailing meteorological conditions in the vicinity of the site.	✓		<b>Section D.2 (Page 60-61)</b>
6	Use QRA Software (Yes / No), if any please state	✓		Gas Dispersion Model named ALOHA <b>Section D.4.2.4 (Page 65-67)</b>
7	An estimate of the number of people on site who may be exposed to the hazards considered in the report.	✓		<b>Section B.4.1 &amp; B.4.2 (Page 38)</b> <b>Section D.5.2 (Page 79)</b>
8	The consequences to the surrounding areas in the form of appropriate risk measures where possible.	✓		<b>Section D.5&amp; D.6 (Page 79-81)</b>

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9	Risk Contour (Yes / No)	✓		<b>Appendix 6.5</b>
10	Information on probability data sources, provide references	✓		Ref : Rating of Factors in Hazard Evaluation System (After Fine, 1973) <b>Section D.5.5 (Page 80)</b>