



DEPARTMENT OF OCCUPATIONAL  
SAFETY AND HEALTH

# 2023



## Guidance for Preparation and Updating of Report on Industrial Activity Second Edition

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.

This guidance is the reviewed and updating from the First Edition. The needs to revisit the guidance as it has been quite some times since its first published. This second edition of the guidance has been drafted taking into consideration of the current needs and policy, issues arises, comments and recommendation from various parties comprises of DOSH officers, industries, and competent persons.

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 changes made in this current guidance and able to produce a comprehensive report meeting the requirement of the Regulations set forth and expectation of DOSH. This will also ensure consistency and uniformity on the report format as well as the contents across the industries. This guidance as well as will be used by the DOSH to come to conclusions about your report.

This guidance is not intended to be legal document but a practical guide and minimum information provided for industries in writing the report. I would like to emphasize to all owners of major hazards installation to continuously use this guidance as a source of reference in preparing Report on Industrial Activity as it was developed to meet 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 guidance.

Director General  
Department of Occupational Safety and Health  
Malaysia  
2023

# ACKNOWLEDGEMENT

The Guidance for Preparation and Updating of Report on Industrial Activity First Edition 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.

For Second Edition, members of committee involved are all DOSH officers from the CIMAH Section under Petroleum Safety Division.

DOSH would particularly like to thank the following personnel for their most valuable contributions during the preparation and reviewing the guideline.

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## **1. WHAT ARE THE CHANGES?**

It has been quite some times since this guideline have been first developed. The needs to look back the contents and the items in the guidelines has come into DOSH intention recently. The main reason for this guideline to be reviewed is to suit the DOSH current needs and rectification of some issues regarding the implementation and preparation of the reports. Main changes highlighted in the guidelines as shown below. Details of the changes are elaborate further in the following chapters.

- i. Time frame of the report submission;
- ii. Interpretation of the maximum quantity likely on site;
- iii. Obligation for manufacturer with respect to report preparation;
- iv. Compulsory information to be included in Executive Summary;
- v. Compulsory information to be included in the report;
- vi. Amendment pertaining to Summary of Finding.
- vii. Arrangement to identify ageing plant/equipment.
- viii. The emphasizing of knock-ons impact.

## **2. INTRODUCTION**

This document provides guidance 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.

### 3. TERMS & DEFINITIONS

<b>CIMAH Regulations</b>	Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations 1996
<b>CLASS Regulations</b>	Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013
<b>CIMAH Report</b>	Report on Industrial Activity prescribed under CIMAH Regulations
<b>DOSH</b>	Department of Occupational Safety and Health
<b>Competent Person (OKMH)</b>	Competent person registered with DOSH as prescribed in CIMAH Regulations
<b>MOC</b>	Management of Change
<b>QRA</b>	Quantitative Risk Assessment
<b>Facility Owner</b>	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
<b>Manufacturer</b>	Employer or occupier having control of an industrial activity
<b>OSBL Regulations</b>	Offsite battery limit CIMAH Regulations
<b>Report Preparer</b>	Person who prepares the CIMAH Report
<b>Installation</b>	An industrial activity which produces, processes, handles, uses, disposes of or stores, whether permanently or temporarily, one or more hazardous substances or a category or categories of hazardous substances

## 4. ROLES AND RESPONSIBILITIES OF KEY PERSONNEL

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.

### 4.1 Facility Owner

- 4.1.1 Allocate appropriate resources and make necessary preparation for the planning, development, review and submission of CIMAH Report to DOSH.
- 4.1.2 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.
- 4.1.3 Ensure information contained in the report are technically accurate.
- 4.1.4 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
  - Summary of Findings (see **APPENDIX B**)
  - Declaration Letter for CIMAH Report and Emergency Response Plan (see **APPENDIX D**).
  - Other documents as may be required by DOSH from time to time.
- 4.1.5 Make necessary presentation on the report as may be requested by DOSH.
- 4.1.6 Accountable for implementation of the systems, procedures and arrangements described in the report.

## 4.2 Report Preparer

- 4.2.1 Gather or obtain necessary information and reference document required for preparation of CIMAH Report. Name of the reference information, document, standard should be put under the title **REFERENCES or RUJUKAN** in the report.
- 4.2.2 Interpret the information, including results of risk assessments, and prepare the report in accordance to the CIMAH Regulations and specification set forth in this guidance.
- 4.2.3 Consult with the Facility Owner to ensure information contained in the report are accurate.
- 4.2.4 Report can be presented either in Malay or English. Report should be prepared in plain and easy to understand language as well as put more explanatory diagrams. This is because not all people especially DOSH or other authorities are familiar with the activity at site.

## 4.3 Competent Person (OKMH)

- 4.3.1 In the case Competent Person (OKMH) is also the Report Preparer, undertake all roles and responsibilities as outlined in Section 4.2
- 4.3.2 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 this guideline set forth.
- 4.3.3 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.
- 4.3.4 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.
  - Summary of Findings (see **APPENDIX B**)

- Stated latest Registration Number of OYK MH in Declaration Letter or else the report will not be accepted by Department.
- Declaration Letter for CIMAH Report and Emergency Response Plan (see **APPENDIX D**)
- Other documents as may be required by DOSH from time to time.

## 5 ROLE OF CIMAH REPORT

- 5.1** The conclusions given by DOSH should not be seen as a permission for continued operation. The report provides information about the measures to prevent or limit the consequences of a major accident as well as one of the main reference for facility owner, manufacturer or other authorities to know the risk associated with the plant activity.
- 5.2** In addition, manufacturer must demonstrate at site all the elements, measures, procedure etc. at the time report is written. Demonstration means to **show, justify or make the argument through the information given.**
- 5.3** At the time report was submitted, DOSH will presume the contents are true, accurate and been applied at site, unless it has information to the contrary.
- 5.4** However, inspector from DOSH may ask to see document to prove the claims as part of inspection or audit programme.

## 6 TIME FRAME FOR PREPARATION, SUBMISSION AND REVIEW

### 6.1 Preparation of New CIMAH Report

6.1.1 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.

- 6.1.2 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.
- 6.1.3 Where a manufacturer has commenced an industrial activity after the commencement of CIMAH Regulations, the CIMAH Report must be submitted to DOSH **immediately**. However, manufacturer may submit an application in writing for extension of time for consideration by DOSH. DOSH has all the right to accept or reject the application.
- 6.1.4 A Copy of Valid Competency Registration Slip / OKMH Certificate should be attached together with the CIMAH Report.

## 6.2 Update of CIMAH Report

- 6.2.1 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 manufacturer (regardless of date of final or supporting information by DOSH).
- 6.2.2 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 (increase or decrease) or throughout of the existing hazardous substance which result 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

- 6.2.3 A Copy of Valid Competency Registration Slip / OKMH Certificate should be attached together with the CIMAH Report.

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

- 6.3.1 It is not an obligation for DOSH to review the CIMAH report submit by manufacturer. It is manufacturer obligation to ensure the report accuracy, completeness and fulfil the requirements prescribed in CIMAH Regulations and this guidance set forth.
- 6.3.2 However, should DOSH required further information, DOSH will direct the manufacturer for clarification within such time as it may specify.
- 6.3.3 Submission of supporting documents arising from the DOSH instruction can be done via softcopy or hardcopy

## **7 REPORT FORMAT**

- 7.1** CIMAH Report for a particular site should be prepared in a single document.
- 7.2** CIMAH 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.
- 7.3** For the submission of report to DOSH, the report may be submitted in hardcopy or softcopy or any methods specify by DOSH.

## 8 STRUCTURE AND CONTENT OF REPORT

CIMAH Report should be prepared according to the structure and contents as discussed in this guidance. The information on the report shall be included but not limited to the following.

i. Executive Summary

- a. The executive summary should include an introduction about the installation i.e. name, location (address and GPS coordinates) and ownership/operatorship of the installation, and industrial activities undertaken at the location.
- b. This section should summarize key information and findings from part A, B, C and D as well as recommendation from OKMH to close gaps or improve the management of the installation to prevent, control or mitigate major incident.
- c. Detailed on the contents of the executive summary are provided in **APPENDIX A**

ii. Summary of findings

- a. This section is required to be included for revised or updated CIMAH Report to highlight key changes to the contents. Sample of the form is shown in **APPENDIX B**.

iii. Definitions/Abbreviation

- b. All acronyms, abbreviations and specific terms referred to in the CIMAH Report should be listed and defined.

iv. Introduction

- a. 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.
- b. 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.
- c. If the report is a three years' 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.

v. Main Report Contents

- a. The main contents of the report should have covered recommendation from OKMH as well as information as per Schedule 6 of CIMAH Regulations as follows.

A. 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 most effective 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.*

B. 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.*

#### C. 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.*

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

#### D. 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 information on the contents of the above sections are provided in **APPENDIX C**.

**vi. References**

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

**vii. 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.

## **9 REFERENCES**

1. *Occupational Safety and Health (Control of Industrial Major Accident Hazards) Regulations 1996*
2. *Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013*
3. *HSE UK: The Control of Major Accident Hazards Regulations 2015*
4. *Preparing Safety Reports: Control of Major Accident Hazards Regulations 1999*

## EXECUTIVE SUMMARY

The executive summary should include an introduction about the installation i.e. name, location (address and GPS coordinates) 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

- i. Hazardous substances, the quantity and brief description of hazards created by them. This information shall be presented in the table;
- ii. All hazardous substances amount of less than 10% which could be a potential Initiating Event of Major Accidents including raw material, finished product, by product, intermediate product, fuel, additives, or waste shall be presented in the summary. This information shall be presented in the table;
- iii. General description of the facilities and the processes or storage involving hazardous substances;
- iv. Arrangements for safe operation in terms of management system, operational control procedures or processes established at site;
- v. 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. The information shall be included but not limited to the following.
  - All types of events/scenarios considered in the analysis;
  - Worst case event/scenario considered in the analysis;
  - A diagram showing the location of hazardous substances and its quantities;
  - Number of personnel likely to be affected by major accidents. This information shall be presented in the table;
  - Location Specific Individual Risk (LSIR) iso-risk contour;
  - F-N curves (Risk curve that display the probability of having N or more facilities per year)
- vi. Any action plans or recommendation from OKMH which have been identified to close gaps or improve the management of the installation to prevent, control or mitigate major incident.

# SUMMARY OF FINDINGS

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

Nama Pemasangan :

Alamat Pemasangan :

No. Daftar JKPP :

BAHAGIAN	NO	PERKARA	PENEMUAN (LAPORAN SEBELUM)	PENEMUAN (LAPORAN SEMASA)
A. Maklumat Berkaitan Bahan Berbahaya	i	Nama Bahan Berbahaya	Bahan Berbahaya yang disimpan atau digunakan adalah gas dan larutan Ammonia, Klorin dan Gas Asli. <b>(Rujuk Seksyen A.1)</b>	Terdapat pertambahan bahan berbahaya baru dalam senarai iaitu bahan berbahaya Oksigen <b>(Rujuk Seksyen A.1)</b>
	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>▪ Ammonia - <i>Draeger Method and Field Gas Detectors</i></li> <li>▪ Gas Toksik dan Mudah Terbakar - <i>Field Gas Detectors</i></li> </ul> <b>(Rujuk Seksyen A.2)</b>	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>▪ Ammonia - <i>Draeger Method and Field Gas Detectors</i></li> <li>▪ Gas Toksik dan Mudah Terbakar - <i>Field Gas Detectors</i></li> <li>▪ Oksigen – <i>Trace Oxygen Analyzer</i></li> </ul> <b>(Rujuk Seksyen A.2)</b>
	iii	Bahaya Yang Boleh Diwujudkan Oleh Bahan Berbahaya	Pelepasan gas toksik ( <i>toxic gas release</i> ) melibatkan ammonia dan klorin. <b>(Rujuk Seksyen A.3)</b>	Oksigen merupakan bahan yang bersifat reaktif dan boleh menyebabkan kebakaran atau menyebabkan kebakaran menjadi bertambah besar. <b>(Rujuk Seksyen A.3)</b>
	iv	Darjah Ketulenan Bahan Berbahaya	Kandungan air dan oksigen yang tinggi boleh menyebabkan <i>stress</i>	Kandungan air dan oksigen yang tinggi boleh menyebabkan <i>stress</i>

BAHAGIAN	NO	PERKARA	PENEMUAN (LAPORAN SEBELUM)	PENEMUAN (LAPORAN SEMASA)
			<i>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% <b>(Rujuk Seksyen A.4)</b>	<i>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% <b>(Rujuk Seksyen A.4)</b>
B. Maklumat Berkaitan Pemasangan	i	Peta Tapak dan Kawasan Persekitaran	Pelan tapak Loji ABC dan kawasan persekitaran ada dinyatakan pada Apendiks 2: Gambarajah 1.	Pelan tapak Loji ABC dan kawasan persekitaran ada dinyatakan pada Apendiks 2: Gambarajah 1. Kedudukan tangka yang menyimpan Oksigen dimasukkan dalam peta tapak
	ii	Pelan Skala Tapak	Pelan tapak berskala ditunjukkan dalam Apendiks 2: Gambarajah 2	Pelan tapak berskala ditunjukkan dalam Apendiks 2: Gambarajah 2.
	iii	Penerangan Proses atau Penyimpanan Bahan Berbahaya	Aktiviti dan kemudahan pemprosesan adalah seperti berikut. <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> Sistem pengolahan bahan kumbahan ( <i>effluent treatment system</i> ) sedang dinaiktaraf dan ringkasan sistem tersebut dibincangkan dalam Seksyen B.3.3.5. Inventori dan kedudukan bahan-bahan berbahaya ditunjukkan dalam pelan tapak pada Apendiks 2: Gambarajah 2.	Aktiviti atau proses atau penyimpanan melibatkan bahan berbahaya Oksigen dimasukkan dalam penerangan. Inventori dan kedudukan bahan-bahan berbahaya termasuk Oksigen ditunjukkan dalam pelan tapak pada Apendiks 2: Gambarajah 2.
	iv	Bilangan Maksima Orang di Tapak	Bilangan maksima pekerja adalah 434 orang pada waktu siang (pekerja pejabat dan shift). Taburan bilangan dan kedudukan orang di tapak ditunjukkan dalam pelan tapak pada Apendiks 2: Gambarajah 3A dan 3B.	Bilangan pekerja bertambah dari jumlah sebelum ini iaitu dari 434 kepada 442 kerana terdapat proses unit yang baru melibatkan bahan berbahaya Oksigen
	v	Penggunaan Tanah dan Taburan Penduduk di Sekitar Tapak Aktiviti Industri	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. Kebanyakan penduduk luar tapak adalah pekerja di Pelabuhan XYZ (1224 orang), Loji Petrokimia DEF (1000 orang) dan Loji Janakuasa TMB (347 orang).	Terdapat pertambahan industri berbanding dengan tahun-tahun sebelum ini iaitu dengan pembinaan 2 industri iaitu 1 kilang penghasilan Methanol dan Terminal Simpanan Bahan Petroleum. Terdapat juga kawasan perumahan yang baru siap dibina yang terletak di kawasan sekitar 5 km dengan anggaran penduduk ialah 400 orang. Rujuk Seksyen B.5.1

BAHAGIAN	NO	PERKARA	PENEMUAN (LAPORAN SEBELUM)	PENEMUAN (LAPORAN SEMASA)
			Rujuk Seksyen B.5.1	
	vi	Perkhidmatan Kecemasan	Perkhidmatan kecemasan terdekat adalah Hospital Besar XYZ (5.5 km), Polis Di Raja Malaysia (8.4 km) dan BOMBA (10.6 km). Bantuan kecemasan boleh juga diperolehi daripada loji-loji berhampiran seperti yang kebanyakannya adalah ahli kumpulan XYZ Emergency Mutual Aid.	Perkhidmatan kecemasan terdekat adalah Hospital Besar XYZ (5.5 km), Polis Di Raja Malaysia (8.4 km) dan BOMBA (10.6 km). Bantuan kecemasan boleh juga diperolehi daripada loji-loji berhampiran seperti yang kebanyakannya adalah ahli kumpulan XYZ Emergency Mutual Aid.
C. Maklumat Berkaitan Sistem Pengurusan Keselamatan dan Kesihatan	i	Pengurusan Kakitangan	Walaupun keselamatan adalah tanggungjawab bersama, semua peringkat pengurusan mempunyai tanggungjawab dan peranan masing-masing terhadap keselamatan ( <i>line responsibility</i> ). Pegarah Urusan syarikat memikul tanggungjawab tertinggi bagi memastikan operasi loji dijalankan dengan selamat. 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. Organisasi terkini dimasukkan di dalam Apendiks 5.	Walaupun keselamatan adalah tanggungjawab bersama, semua peringkat pengurusan mempunyai tanggungjawab dan peranan masing-masing terhadap keselamatan ( <i>line responsibility</i> ). Pegarah Urusan syarikat memikul tanggungjawab tertinggi bagi memastikan operasi loji dijalankan dengan selamat. 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. Organisasi terkini dimasukkan di dalam Apendiks 5.
	ii	Pengurusan Operasi Selamat	Di antara kaedah pengurusan operasi selamat bagi menghindar dan mengawal bahaya kemalangan besar adalah <ul style="list-style-type: none"> <li>▪ Perlaksanaan sistem pengurusan keselamatan dan alam sekitar ISO 45001 an ISO 14001</li> <li>▪ Perlaksanaan <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> </ul>	Di antara kaedah pengurusan operasi selamat bagi menghindar dan mengawal bahaya kemalangan besar adalah <ul style="list-style-type: none"> <li>▪ Perlaksanaan sistem pengurusan keselamatan dan alam sekitar ISO 45001 an ISO 14001</li> <li>▪ Perlaksanaan <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> </ul>

BAHAGIAN	NO	PERKARA	PENEMUAN (LAPORAN SEBELUM)	PENEMUAN (LAPORAN SEMASA)
			<ul style="list-style-type: none"> <li>▪ Penilaian bahaya (<i>hazard and effect management process</i>)</li> <li>▪ Program pemeriksaan dan audit</li> <li>▪ Prosedur melapor dam menyiasat kemalangan</li> <li>▪ Pelan tindakan kecemasan</li> <li>▪ Penggunaan alat perlindungan keselamatan diri (<i>personal protective equipment dan escape set</i>)</li> </ul> <p>Rujuk Seksyen C.2</p>	<ul style="list-style-type: none"> <li>▪ Prosedur melapor dam menyiasat kemalangan</li> <li>▪ Pelan tindakan kecemasan</li> <li>▪ Penggunaan alat perlindungan 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> <p>Rujuk Seksyen D.1.3</p>	<p>Kemalangan besar boleh berlaku jika gas Oksigen terlepas ke udara dan kawasan berdekatan terdapat sumber nyalaan (<i>ignition source</i>). 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 dilanggar oleh kenderaan seperti forklift, lori etc.</li> </ul> <p>Rujuk Seksyen D.1.3</p>
	ii	Gambarajah Loji Berkaitan Ciri Penting Kemungkinan Kemalangan Besar, Pencegahan atau Kawalan	<p>Gambarajah kemudahan-pencegahan atau kawalan (<i>Gas Detection System dan Toxic Shelter</i>) ditunjukkan dalam Apendiks 3: Gambarajah 3.</p>	<p>Tambahan gambarajah susun atur alat pengesan gas Oksigen yang baru dipasang di tapak ditunjukkan di Apendiks 3 (a): Gambarajah 4.</p>
	iii	Langkah Mencegah, Mengawal atau Mengurang Akibat Kemalangan Besar	<p>Langkah-langkah mencegah, mengawal atau mengurang 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> </ul>	<p>Langkah-langkah mencegah, mengawal atau mengurang 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> </ul>

BAHAGIAN	NO	PERKARA	PENEMUAN (LAPORAN SEBELUM)	PENEMUAN (LAPORAN SEMASA)
			<ul style="list-style-type: none"> <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 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>.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Klasifikasi kawasan merbahaya (<i>Hazardous Area Classification</i>)</li> <li>▪ Pelan tindakan kecemasan 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>.</li> </ul>
	iv	Maklumat Kajicuaca	Maklumat kajicuaca berkaitan suhu, humiditi, hujan dan keadaan angin diperolehi daripada Jabatan Kajicuaca Daerah. Data tersebut digunakan bagi meramal pergerakan dan kesan terhadap pelepasan gas toksik semasa kecemasan	Maklumat kajicuaca berkaitan suhu, humiditi, hujan dan keadaan angin diperolehi daripada Jabatan Kajicuaca Daerah. Data kajicuaca telah dikemaskini iaitu dari tahun 2002-2023.
	v	Bilangan Orang di Tapak atau Luar Tapak yang Mungkin Terlibat	Bilangan orang di tapak yang terdedah dan mungkin terlibat dalam kemalangan besar di loji dianggarkan 784 orang (operasi biasa) atau 1434 orang (semasa <i>turnaround</i> ) Rujuk Seksyen B.4.1 dan B.4.2 Bilangan orang di luar tapak yang terdedah dianggarkan 3000 orang Rujuk Seksyen D.5.2	Sejak pembesaran operasi kilang pada tahun 2019, Bilangan orang di tapak yang terdedah dan mungkin terlibat dalam kemalangan besar di loji telah bertambah dari 784 orang (operasi biasa) kepada 850 orang. Anggaran jumlah pekerja semasa <i>turnaround</i> juga meningkat dari 1434 kepada 1560. Rujuk Seksyen B.4.1 dan B.4.2 Bilangan orang di luar tapak yang terdedah telah bertambah dalam tempoh 3 tahun iaitu dari 3000 orang kepada 4500 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 ( <i>NIOSH Immediate Danger to Life and Health (IDLH)</i> ) 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 $1 \times 10^{-6}$ <i>fatality per year</i> . Rujuk Seksyen D.5 dan D.6	Analisa <i>consequence modelling</i> telah mengambil kira pengenalan bahan merbahaya baru iaitu Oksigen Berdasarkan kepada Laporan QRA yang telah dijalankan, risiko terhadap penduduk persekitaran dalam bentuk <i>Individual Risk Contour</i> didapati <b>MASIH</b> berada pada paras yang dibenarkan iaitu di bawah $1 \times 10^{-6}$ <i>fatality per year</i> walaupun dengan kemasukan bahan merbahaya a Oksigen. Rujuk Seksyen D.5 dan D.6

Berdasarkan kepada penemuan di atas, kami

- i)                     **Nama pengilang**                     dan
- ii)                     **OKMH**                     dengan pendaftaran                     **No. daftar OYK**

mengesahkan telah mengambil kira terutamanya pengetahuan teknikal baru yang ketara memberi kesan kepada butiran dalam Laporan yang terdahulu yang berkaitan dengan keselamatan dan peningkatan dalam pengetahuan mengenai penilaian bahaya.

Dengan itu mengesahkan bahawa:

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

.....

.....

Nama Pengilang: .....

Nama Orang Kompeten: .....

Jawatan: .....

No. Daftar OKMH: .....

Tarikh:

Tarikh:

# GUIDELINE ON THE CONTENTS OF REPORT AS PER SCHEDULE 6 OF CIMAH REGULATIONS

## Part A

### Schedule 6(a) : Information Relating to the Hazardous Substances

#### GUIDANCE

This section applies to hazardous substances which is more than 10% of the threshold quantity as per notification to DOSH prescribed in CIMAH Regulations. For the purpose of this notification, the Facility Owner may declare the maximum quantity likely on site. Definition of the maximum quantity likely on site is based on the design capacity of the installation, tanks, process equipment such as vessels, pipelines etc. Maximum quantity likely on site can also be referred to other legal authorisations which refer to quantities as example approval license Ministry of Domestic Trade (KPDN) for usage or storage of Liquefied Petroleum Gas (LPG). Depending on the design capacity of the installation, any significant increase or reduction in the quantity in the future shall be notified to DOSH in accordance to CIMAH Regulations. However, if you do not wish to declare maximum quantity based on the design capacity, you must demonstrate and prove to DOSH that the quantity will not meet the design capacity at any time. All the documents e.g., inventory records, sales and purchased receipt or any information as required by DOSH must be presented and provided to DOSH for review. DOSH will decide either to accept or reject the application.

In identifying hazardous substances and the quantity for notification to DOSH, consideration should be made on the substances related to the processes and storage.

#### Process Related

The activities described should include, not only the process itself, but also any associated onsite storage and transport of the substances.

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:

*50 tonnes chlorine are used in a **chlorination process**. 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.*

*The quantity of chlorine (50 tonnes) 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.*

#### Storage Related

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.

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.

#### **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*

#### **Schedule 6(a)(i)**

- 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 Table 1 containing the following information, as minimum:
  - Name of Substance
  - Hazard Classification based on Indicative Criteria or Group specified in Schedule 1 or 2 of CIMAH Regulations
  - Nature of Substance (e.g., raw material, finished product, by product, intermediate product, fuel, additives, or waste)
  - Quantity Likely on Site (tonnes) – This has to be specified in absolute quantity instead of production rate or capacity
  - Threshold Quantity (tonnes)
  - All hazardous substances amount of less than 10% including raw material, finished product, by product, intermediate product, fuel, additives, or waste which could be a potential initiating event of major accidents.
- 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.
- 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.

Generally, trade names should not be used.

Multicomponent mixtures such as gasoline or naphtha for example can be identified by means of the CAS number.

**Table 1: Hazardous Substances**

<b>Hazardous Substance</b>	<b>Hazard Classification</b>	<b>Nature of Substance</b>	<b>Quantity Likely Onsite (tons)</b>	<b>Threshold Quantity (tons)</b>
<b>Substances above Threshold Quantity</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>Substances above 10% of Threshold Quantity</b>				
<i>LPG</i>	<i>Flammable Gas</i>	<i>Fuel</i>	<i>30</i>	<i>50</i>
<b>Substances below 10% of Threshold Quantity which could be a potential Initiating Event of Major Accidents</b>				
<i>Bromine</i>	<i>Toxic</i>	<i>Raw Material for Chlorination Process</i>	<i>0.8</i>	<i>10</i>

<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. fixed detector, 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>c. Selection of analytical method used should be acceptable, reasonable and the most effective for quick determination of hazardous substances presence.</p>
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<p><b>A.3</b></p> <p><i>A brief description of the hazards</i></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</li> </ul>
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which may be created by the hazardous substance

**Schedule 6(a)(iii)**

or compatibility, reactions or decomposition rates which could be source of major accidents such as toxic release, fire or explosion.

Any subsequent hazards which can be created due to change e.g., thermal decomposition of the product during fire incident should be included.

- 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.

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.

- b. It is recommended that the above information in item (a) above are presented in the form of a table as shown in the Table 2.

**Table 2:** Description of Hazards

<b>Hazardous Substance</b>	<b>Physical Hazard</b>	<b>Health Hazard</b>	<b>Environmental Hazard</b>
<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

	<p>be included in the report as attachments or appendices. Safety data sheets (SDS) should be the latest revision and in line with CLASS Regulations.</p>
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<p><b>A.4</b></p> <p><i>The degree of purity of the hazardous substance and the names of the main impurities and their percentages</i></p> <p><b>Schedule 6(a)(iv)</b></p>	<p>a. For every hazardous substance 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.</p> <p>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.</p> <p>c. Any inherently unstable substances e.g. organic peroxides, iron sulphide 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.</p>
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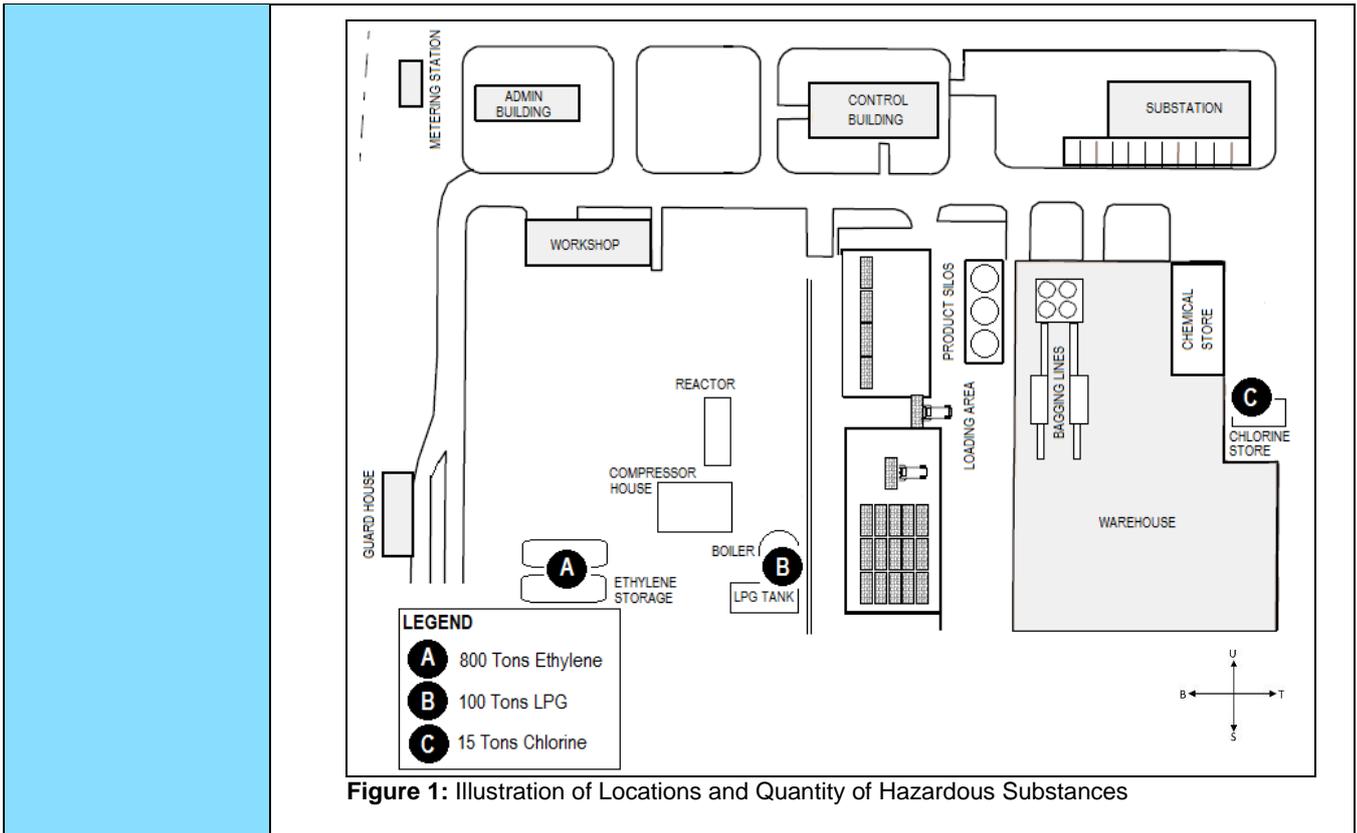
<p><b>Part B</b> <b>Schedule 6 (b) : Information on the Installation</b></p>
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<p><b>GUIDANCE</b></p> <p>This section should contain broad description about the installation to enable its personnel, enforcement authorities and other relevant parties 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>
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<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> </ul>
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	<ul style="list-style-type: none"> <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.</p> <p>f. The cardinal direction or cardinal point must be indicated on the map.</p> <p>g. The maps provided must be well illustrated and indicated clearly (viewable and readable).</p>
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<p><b>B.2</b></p> <p><i>A scale plan of the site showing the locations and quantities of all significant inventories of the hazardous substances</i></p> <p><b>Schedule 6(b)(ii)</b></p>	<p>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.</p> <p>b. The layout plan should be of suitable scale to adequately show facilities, infrastructures and other activities on the installation such as follows:</p> <ul style="list-style-type: none"> <li>▪ Process units or facilities (e.g. reactor, furnaces, compressors, vessels etc.)</li> <li>▪ Storage tanks</li> <li>▪ Utilities units or facilities (e.g. plant air system, cooling tower, steam generation, fire water system etc.)</li> <li>▪ Control rooms and operator shelters</li> <li>▪ Outside battery limit (OSBL) facilities e.g. administration building, laboratory, warehouse, clinic, workshop, fire station, electrical substation, wastewater treatment plant, firewater tank/pond etc.</li> <li>▪ Escape routes from or across the installations</li> <li>▪ Location of emergency and mitigation control systems such as firefighting system and equipment, fire and toxic gas detectors, assembly areas, temporary refuges, and windsock.</li> </ul> <p>▪ The layout plan provided must be well illustrated (viewable and readable). The location and quantity of hazardous substances under storage or being used or processed must be indicated or superimposed on the layout plan as shown in Figure 1.</p>
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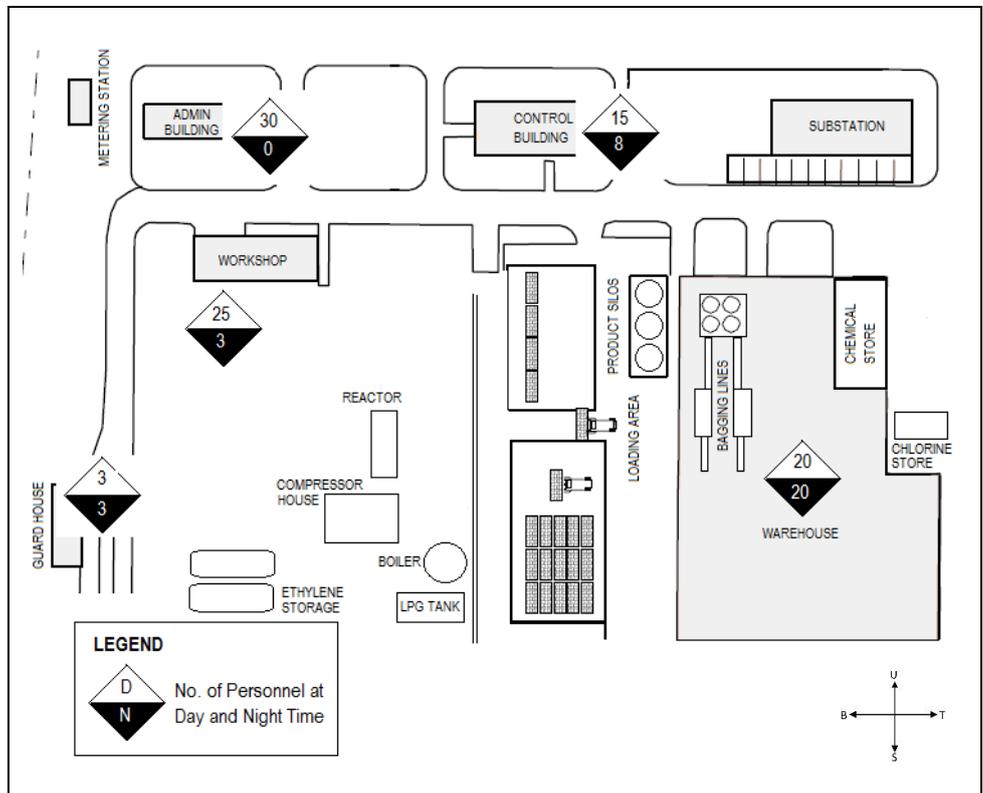


<p><b>B.3</b></p> <p><i>A description of the process or storage involving the hazardous substances and an indication of the conditions under which it is normally held</i></p> <p><b>Schedule 6(b)(iii)</b></p>	<p>a. General description should be given on the process and/or storage activities involving 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. Mass and energy balance should be included and it is <b>COMPULSORY</b> for industry that has complex process.</p> <p>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 bund wall, dikes, sump pit, safety and fire protection system including firewater 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>a. The maximum number of people (including contractors, delivery drivers and office staff) who may be present during the day and night time and must be presented in a table and, illustrated on the plant layout or map as shown in Table 3 and Figure 2 below.</p> <p><b>Table 3: Maximum Number of Personnel at Day and Night Time</b></p>
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**Schedule 6(b)(iv)**

Location	No. of personnel	
	Day	Night
Administration Building, manning various departments : Technical Services, Human Resources; HS, Finance & Logistics	30	-
Warehouse	20	2
Workshop	25	3
Laboratory	32	7
Central Control Building	15	8
Security Guard House	3	3



**Figure 2:** 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**

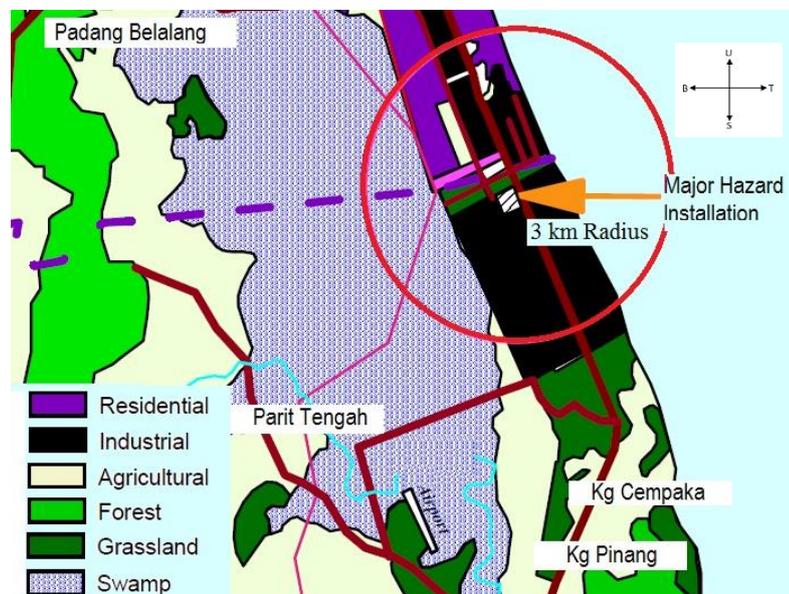
- a. Natural environment and surroundings of the installation such as the land use and distribution of personnel in the vicinity should be discussed and illustrated on a site

*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)**

map shown in Figure 3, 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., high electricity voltage power distribution lines, gas, radio transmission mast that could interfered communication system, 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 Table 4.



**Figure 3:** Land Use

**Table 4:** Distribution of Offsite Population

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

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

**NOTES:** Sources of information taken or used for the estimation number of population must be clearly stated in the report (e.g. Malaysia Housing Census, District Council, Local Authority Council etc.)

**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 Table 5 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 (firefighting, medical services, HAZMAT response, security, traffic control etc.)

**Table 5:** Nearest Emergency Services

<b>Emergency Services</b>	<b>Distance (km)</b>	<b>Estimated Arrival Time (min)</b>	<b>Type of Services</b>
<i>Fire Station</i>	1	<1	<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>	10	7.5	<ul style="list-style-type: none"> <li>• <i>Medical services</i></li> </ul>
<i>District Hospital</i>	7	5.25	<ul style="list-style-type: none"> <li>• <i>Ambulance</i></li> <li>• <i>Medical services</i></li> </ul>
<i>Polis Station, Taman Cempaka</i>	10	7.5	<ul style="list-style-type: none"> <li>• <i>Croud control</i></li> <li>• <i>Security</i></li> </ul>

**Part C**  
**Schedule 6 (c) : Information Relating to the Management System**

**GUIDANCE**

Introductory part of this section should describe about management system framework put in place such as the health, safety and environment management system (HSEMS), ISO 45001 or other management system that defines and implements the safety and health policy. Detailed description on specific elements is described in the subsections

**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*

**Schedule 6(c)(i)**

- a. This section should discuss the following:
- Organisation structure from the top down to the first line supervisory level describing the roles and responsibilities on safety and health, including the name of personnel and position responsible on the site. The organisation chart should be included
  - Safety and Health organisation and function in the forms of
    - i. Site Safety and Health Committee
    - ii. Safety and Health Department, Section or Function
  - Emergency response organisations chart with the name of personnel and contact number
  - The name of personnel and position authorized to
    - i. activate emergency response
    - ii. inform outside authorities of emergency situation
  - System or arrangement for determining and maintaining minimum staff level under all foreseeable operating conditions. These may include
    - Management of Change (MOC) process on organisational changes to ensure availability of competent personnel for operation
    - General reference concerning coverage for key personnel e.g. plant manager etc. in their absence
    - Implementation of duty roster to ensure adequate coverage during silent hour through by duty manager, if any
- b. A tabulation of manning / manpower level by department, trade, job function or other categories should be included as appropriate

**C.2**

*The arrangement made to ensure that the means provided for the safe*

- 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><i>operation of the industrial activity are properly designed, constructed, tested, operated, inspected and maintained</i></p> <p><b>Schedule 6(c)(ii)</b></p>	<ol style="list-style-type: none"> <li>1) Aspects related to design, construction, installation 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) Arrangement to established or settings the operating limits for all the plant and equipment especially for high risk equipment or when it involves with the process involving hazardous substances. Operating limits may consider normal operating limits and safe operating limits for pressures, temperatures, flow rates etc.</li> <li>4) Established operational control procedures covering routine or non-routine + operation, start-up, and shutdown, responses to deviations from normal operating conditions as well as in case of emergency</li> <li>5) Inspection, testing, corrective/preventive maintenance and other specific integrity management program such as risk-based inspection (RBI) for ensuring integrity of critical equipment or controls. The scheduling and ranking of routine maintenance activities should be included in the report.</li> <li>6) Identification of the Safety Critical Equipment (SCE) and its arrangement to ensure its integrity and functionality.</li> <li>7) Arrangement to identify plant/equipment showing sign of ageing.</li> <li>8) Decommissioning, abandonment and disposal.</li> <li>9) Safety audit and inspection programs</li> <li>10) Management of change (MOC) on the plant facilities or equipment, organisations, procedures, processes, materials and external circumstances which are capable of affecting the control of major accident hazards (where appropriate).</li> <li>11) Incident reporting, investigation and sharing of lessons learnt</li> <li>12) 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>13) Arrangement for safety reviews or studies undertaken prior to execution of critical tasks e.g. pre-start up safety review</li> <li>14) 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>15) Implementation of other program or initiatives e.g. ISO Certification, Behavioural Safety Program, Human Factor program etc.</li> <li>16) 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</li> </ol>
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	<p>17) Safety performance monitoring and measurement (e.g. safety leading and lagging KPIs, process safety metrics)</p> <p>18) 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>
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<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>▪ Refresher training</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>
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**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 (Figure 1: Hazardous Substances) 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
- Power failure
- External events, where relevant, such as aircraft impacts, earthquake, forest fires, flood, lightning and extreme environmental conditions

**Knock-ons effect**

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. This knock-on impact not necessarily resulted from incident inside the plant but it may come for other installations nearby. This such scenarios should be identified and addressed.

### 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

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 referring 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 Table 6 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

**Table 6:** Examples of Potential Sources of Major Accidents

<b>Location</b>	<b>Hazardous Substance</b>	<b>Hazard Event</b> <i>(Conditions leading to major accident)</i>	<b>Potential Major Accident</b>
<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>

**D.2**

*A diagram of the plant in which the*

This section should include

- a. Descriptions and diagram(s) containing the following information:

<p><i>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>	<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. Descriptions and diagram(s) on emergency control systems such as firewater system network, fire and gas detectors, assembly areas, temporary refuges etc.</p>
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<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, diversion walls</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 runaway reactions</li> <li>5) <b>Detection System</b> e.g. fire and gas detection and alarm system, analysers for impurities/contaminants</li> </ol>
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- 6) **Depressurisation and Shutdown System** e.g. emergency venting and depressurisation system, ESD, emergency shut-off 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 as HAZID, bowtie analysis or other appropriate methods could be used and presented in a table such as shown in Table 7.

**Table 7:** Hazards and Effect Prevention, Control and Mitigation

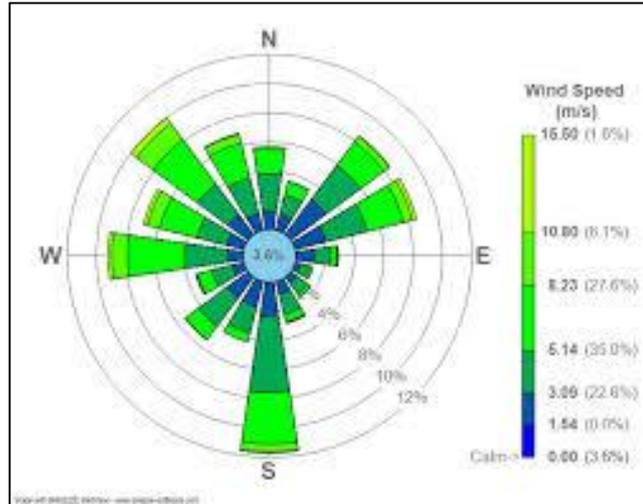
<b>System/Equipment : WASTE HEAT BOILER (08-E001A)</b>				
<b>Hazard Event</b>	<b>Threat, Cause or Initiating Event</b>	<b>Effect/Consequence</b>	<b>Preventative Measures</b>	<b>Control/Mitigations</b>
<i>LPG release due to Joint Failure</i>	<i>Bolt relaxation</i>	<i>Minor leak (5mm), leading to major leaks and fire</i>	<i>Management of critical joints</i>	<i>Online repair procedures  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  Release to atmosphere, leading to fire</i>	<i>Pressure alarm PRAH 07030  Periodic testing of PSV (every 3 months)</i>	<i>PSV vented at safe location  Increase purge by opening HIC-08007 to reduce loop pressure  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 ALARP (As Low as Reasonably Practicable) should be used in determining the level of preventive measures and controls required.

- 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.
- d. Description on emergency preparedness and response measures covering the following

	<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>– Emergency control centres</li> <li>– Assembly points as well as alternative assembly points</li> <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>
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<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 6.</p>
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**Figure 4:** 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 must be presented in the form of a table as shown in Table 8, describing the incident scenario, number of personnel affected by the accident and the distance from the accident location.

**Table 8:** 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

**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 Table 9.

Information on all the scenarios including worst case must be shown in the report and the impact contours must be indicated on the plant layout or map.

For this report, report preparer must provide a sample or example of details calculation for selected scenario.

The input data used in the software must be provided in the report and can be included as an attachment or appendix

**Table 9:** Consequence to the Surrounding Likely to be Affected by Major Accidents

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

- 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 and F-N curves must be included in the report and compared with available risk

	<p>acceptance criteria e.g. a fatality risk level of “1 in a million per year” or <math>(1 \times 10^{-6})</math> for residential area.</p> <p>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.</p> <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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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 pengilang** \_\_\_\_\_, SEBAGAI \_\_\_\_\_ **Jawatan** \_\_\_\_\_

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

IAITU **Nama OKMH** \_\_\_\_\_, DENGAN NOMBOR PENDAFTARAN JABATAN KESELAMATAN DAN KESIHATAN PEKERJAAN \_\_\_\_\_ **No. daftar OYK** \_\_\_\_\_

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 MELEBIHI 2 TAHUN ATAU KEDUA-DUANYA SEKALI.

TANDATANGAN & COP PENGILANG

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

TANDATANGAN ORANG KOMPETEN

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

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

