

UNIVERSITI TEKNOLOGI MARA

**ACCIDENTAL RELEASE OF CHLORINE FROM
STORAGE FACILITY AND ON-SITE ERP: A
CASE STUDY AT SUNGAI DUA PENANG**

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ABSTRACT

Accidental release of chlorine gas from the storage facility can lead to emergency and endangered the community and environment due to the large amount of chlorine stored in the warehouse. Classified as a highly toxic chemicals, chlorine pose severe hazards when contacting the human body through various ways such as inhalation, contact by skin or eyes and by ingestion. High exposure to chlorine gas can eventually lead to deaths and injuries. An effective and suitable emergency response plan is therefore required to minimize the adverse effects of the gas leakage to the public and environment. Thus, an on-site emergency response plan is crucial to deal with the effects of the release in order to reduce the injuries to the plant personnel and the neighboring community. This research investigated three previous case study related to the accidental release of chlorine all around the world. The background and the chronology of the accidents were thoroughly studied to identify the root causes that lead to the accidents. Besides, various example of emergency response plan for chemical process industries were studied and being compared to determine the key elements of an effective emergency response plan. The best example of the emergency response plan was chosen as a guidelines to develop the most suitable emergency response for the case study at Sungai Dua water treatment plant. As a result from the accidental release scenarios and emergency response plan reviews, possible causes of chlorine leakage in storage facility were highlighted and the most effective emergency response plan to deal with the upset situation was developed at the end of this research.

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CHAPTER 1

INTRODUCTION

1.1 PROBLEM STATEMENT

Large amount of chlorine that are stored in the storage facility whether in a gas or liquid form can be a potential hazard to the community if the release occurred due to the lack of supervision at the plant. To avoid the incident from happening, an adequate and complete emergency response plan is essential to be developed and implemented at the storage area to lessen the impacts of the release to the plant's workers and nearby residents.

1.2 SCOPE OF RESEARCH

The scopes of this research are around the accident release of chlorine scenarios, its possible causes that can lead to the incidents, its consequences to the human and environment and how to prevent it in future. It also focuses on the development of a complete and suitable on-site emergency response plan that can be applied at the chlorine storage facility.

1.3 OBJECTIVES OF STUDY

- i. To identify the causes of accidents due to the chlorine leakage.
- ii. To recognize the suitable preventive measures that can be installed to avoid the possible accidents from occurring again in future.
- iii. To construct a suitable and effective emergency response plan to be implemented at the chlorine storage facility to deal with the unfavorable situations.