

**A STUDY ON THE SEDIMENTOLOGICAL CHARACTERISTICS AND HEAVY
METAL CONTENTS OF KERTEH RIVER ESTUARINE SEDIMENTS**

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**FACULTY OF MARITIME STUDIES AND MARINE SCIENCE
UNIVERSITI MALAYSIA TERENGGANU**

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**A STUDY ON THE SEDIMENTOLOGICAL CHARACTERISTICS AND HEAVY
METAL CONTENTS OF KERTEH RIVER ESTUARINE SEDIMENTS**

By

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**Research Report submitted in partial fulfilment of
the requirement for the degree of
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**DEPARTMENT OF MARINE SCIENCE
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DECLARATION AND VERIFICATION FORM

FINAL YEAR RESEARCH PROJECT

It is hereby declared and verified that this research report entitled:

A Study on the Sedimentological Characteristics and Heavy Metal contents of Kerteh River Estuarine Sediments by Elmi Suziana bt Othman, Matric No. UK21084 has been examined and all errors identified have been corrected. This report is submitted to the Department of Marine Science as partial fulfillment towards obtaining the Degree of **Bachelor of Science (Marine Science)**, Faculty of Maritime Studies and Marine Science, Universiti Malaysia Terengganu.

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as metal reference during pre monsoon

5.7 : Normalization graph for all elements and Iron (Fe)

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as metal reference during monsoon.

LIST OF ABBREVIATIONS

| | |
|------------------|--|
| Mn | Manganese |
| Cu | Copper |
| Cr | Chromium |
| Zn | Zinc |
| Pb | Lead |
| Fe | Iron |
| Sc | Scandium |
| Ti | Titanium |
| ICP-MS | Inductively Coupled Plasma-Mass Spectrometry |
| CVAAS | Cold Vapor Atomic Absorption Spectrometry |
| % | Percentage |
| μm | Micrometer |
| ϕ | Phi |
| > | More than |
| < | Less than |
| r | Correlation |
| HF | Hydrofluoric acid |
| HCL | Hydrochloric acid |
| HNO ₃ | Nitric Acid |

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ABSTRACT

A study on the sedimentological characteristics and heavy metal concentrations in the surface sediment was conducted in Kerteh River Estuarine area, Kerteh Terengganu. This area known by oil and gas petroleum industrial site while at the upper site of the catchment area is dominated by agricultural activities. The sampling was done twice on June 2011 and February 2012 to differentiate both of two monsoons occurred, pre monsoon and monsoon season. Sediment characteristics were analysed to know the size of the sediment such as mean, sorting, skewness and kurtosis. Heavy metals contents was analysed are Mn, Cu, Cr, Zn, Pb, Cd, Ni and Fe. Results showed that highest concentrations of heavy metal contents in this area were leading by Mn, Ni, Cr, Zn, Pb, Cu, Cd and Fe. Total organic carbon result showed pre monsoon is higher than monsoon seasons. Correlation between concentrations of heavy metals contents within particle size and organic carbon also investigated. The result showed between heavy metal and particle size showed Mn is dominated during pre monsoon and only Cu dominates monsoon either heavy metals content with total organic carbon during monsoon season. In additional to state the study, this is polluted by anthropogenic or not based on normalization graph that showed in normal condition.

ABSTRAK

Kajian bagi ciri sedimentologi dan kepekatan logam berat pada enapan permukaan telah dijalankan di Muara Sungai Kerteh, Kerteh Terengganu. Kawasan ini lebih dikenali dengan minyak dan gas industri di mana pada bahagian atas kawasan tadahan ini lebih dominasi terhadap agrikultur aktiviti. Pengambilan sample dijalankan sebanyak dua kali iaitu pada bulan Jun 2011 and pada bulan Februari 2012 untuk membezakan keadaan yang melibatkan dua musim yang berlaku iaitu sebelum tengkujuh and musim tengkujuh. Ciri sedimentology dianalisa untuk mengetahui saiz butir enapan iaitu min, sorting, skewness dan kurtosis. Bagi logam berat analisa dijalankan untuk mengesan unsur Mn, Cu, Cr, Zn, Pb, Cd, Ni dan Fe. Berdasarkan keputusan yang dipaparkan dipimpin oleh Mn, Ni, Cr, Zn, Pb, Cu, Cd and Fe. Jumlah organic karbon dikaji dan musim sebelum tengkujuh mencatat bacaan yang tinggi daripada musim tengkujuh. Kolerasi diantara logam berat dengan saiz butir dan jumlah organic karbon turut diselidik . Keputusan menunjukkan unsure Mn lebih dominasi pada kedua-dua musim bagi kolerasi logam berat dan saiez butir manakala kolerasi diantara logam berat dan jumlah organic carbon menunjukkan Cu mendominasi pada musim tengkujuh sahaja. Tambahan itu, untuk mengetahui kawasan kajian dicemari oleh sumber antropogenik atau tidak, graf normal dilakukan dan mendapati kawasan tersebut berada dalam keadaan normal daripada sebarang unsur pencemaran yang berat.