

Detection and Identification of Sediment Layer to Discover the Marine Mineral Resources Potential in Aruah Islands

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ABSTRACT

Aruah Islands is located on an international shipping line adjacent to Malaysia. The important aspect in borderline management is the maritime resource potential, one of which is sea minerals. In order to dig the information about marine mineral resources in Aruah Islands, a high-resolution seismic reflection with low frequency was applied, which capable to detect the depth and identify the sedimentary layers clearly and accurately. The depth of water and sediment layers were detected using an echosounder, reason Navi sound type 210 with a tow fish 100 kHz and shallow seismic boomer with a single channel type and wave energy 200 Joules. Gravity core and grab sampler were used to collect the sediment sample. There were three stages on seismic interpretation: sequence analysis, facies analysis, and reflection character identification. Furthermore, sediments containing coarse sand-sized minerals were observed using a microscope. The measurement result of Aruah Islands water depth was ranging from 0-80 m, the deepest part is on the Northern of Batu Mandi island which was 80 m depth. Seismic profiles indicated that the upper layer of tertiary sedimentary as the youngest rocks. Based on sediment thickness, the thickest area was found on the Western (approx. 50 m) and the Northern (approx. 32 m). In line with the island's Southern part condition, which was plain or shallow sea exposure, the Southeastern island sediment thickness ranged only about 10-18 m. Generally, based on the analyzed sediment sample, quartz was the main mineral found, which was 60-80% of the composition. Other minerals were zircon, tin, hematite, magnetite, limonite, biotite, and dolomite.

Keywords: *seismic reflection, single channel, mineral sea, Aruah Islands*

INTRODUCTION

Aruah Islands is the outermost region in Rokan Hilir Regency and is located at the North

end bordering the waters of North Sumatra Province. Aruah Island cluster has an area of ± 4 ha, administratively located in the Malacca Strait region, Pulau Jemur Village, Pasir Limau Kapas District, Rokan Hilir Regency, Riau Province. Referring to PP 38/2002 in conjunction with PP 37/2008 regarding the list of geographical coordinates of the baseline points of the Indonesian Islands, it is located approximately

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