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THE FIRST MEGAMERGED SEISMIC DATA PROCESSING PROJECT IN MALAYSIA

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In September 2005, Petroleum Management Unit (PMU) embarked on a project to merge all available 3D migrated stack volumes from peninsular Malaysia blocks and output a single volume. The 3D post stack merging program is necessary to provide 3D regional coverage that can be accurately tied to existing wells and with ability to map and track channels and other geobodies that may form traps for Hydrocarbon accumulations. PMU at the time had available 29 surveys in the Malay basin which was each exclusive in its own right. It had its own orientation, as well as 3D numbering system that referred to its own sub-surface inline and crossline spacing. While many of these 3D surveys overlap and as will be shown, often multiple overlaps, prior to this project no two overlapping or adjacent surveys had been merged onto a common platform.

This project made possible an interaction between data from different surveys. By integrating all volumes PMU could have a multi-purpose dataset which could be used to market for potential partnerships by effectively wrapping all 29 surveys into 1. As well as providing a very useful picture of the subsurface on a common grid, it allows key interpretations to be transposed from survey to survey and to sit on a common grid. These were the driving forces behind the project.

In all, this project merged all 29 available surveys using the latest and largest PM309 survey as the base. Each 3D survey had been most recently processed or re-processed between 1992 and 2004, totaling almost 20,000 square kilometers of input data. The output volume after merging totals more than 16,000 square kilometers, sitting on a common 3D grid and can be stored on a single DLT tape.

This paper looks into the method by which the then Veritas team used to re-grid the surveys to a common 'master' grid. This so-called master grid was set up such that future 3D surveys could be incorporated relatively easily into this dataset. The discussion shows how each volume was matched to be of common amplitude, bandwidth and phase and then finishes off by viewing the philosophy behind the merging of the volumes which culminated in a single output dataset.

The 3D seismic mega-merged data would allow the understanding of the regional geology by interpreting and mapping the newly completed 3D seismic mosaic in view of identifying the near field opportunities in the SE Region of Malay basin, which is the main oil-producing province. The seismic interpretation and mapping includes seismic facies modeling of the merged data, as the outcome of this study would allow visualization of the depositional facies in three dimensions. This is a new technology combining the specialized interpretation with the 3D visualization. We would be able to trace the channel system over this area from this sub-surface image and this would help us to identify new reservoirs especially the stratigraphic traps of channel sands and point bar sands that have not been tested.

Examples of the resultant timeslice images taken from the final mega-merged volume can be seen in Figure 2.
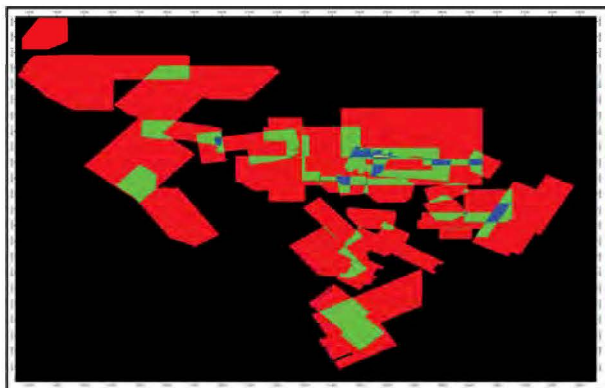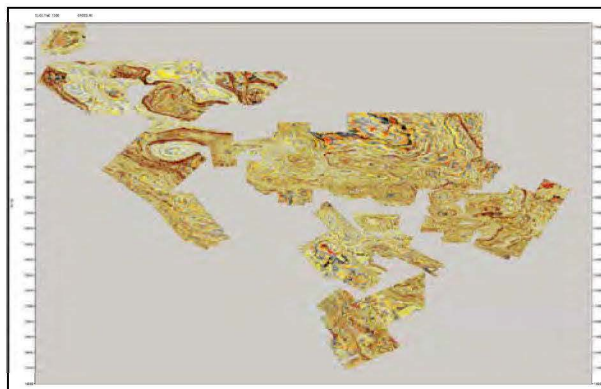

Figure 1. Coverage plot for all 29 surveys before trimming.

Figure 2. Timeslice through the merged output at 1500ms.