

# HEARLEAK Survey Proves the Integrity of Subsea HDPE Pipeline

Integrity assessment tool using acoustic techniques to detect, locate and size leaks from liquid pipelines

## The Challenge

Detecting, locating and sizing leaks in water pipelines remains a major challenge for the effective management of pipeline assets. Selecting the most appropriate leak detection system for a survey depends on a number of factors not least of which is the level of accuracy (or uncertainty) that can be accepted from the measurement technique. This can render many detection methods ineffective when the pipe is inaccessible or where above ground access is restricted.

Pipeline inspection techniques that involve minimum intervention and therefore, minimum above-ground disruption are attractive to operators. Further, there is an additional benefit if these techniques identify and also locate, characterise and size leak sources (enabling the asset team to prioritise remedial work, resulting in minimum disruption to the consumer, while at an acceptable cost to the water company). BHR saw an opportunity in the market for such an inspection tool, called HEARLEAK that is based on a development from TUV in Austria. The tool uses an acoustic sensor mounted on a 'pig' to internally inspect liquid lines.

## The Approach

A leak detection survey was carried out on the world's longest High Density Polyethylene (HDPE) water pipeline in Malaysia. The 27.3 km long subsea HDPE pipeline supplies freshwater from the mainland in Jabatan Bekalan Air Terengganu to the island of Pulau Redang. HEARLEAK was chosen as the most effective, reliable and safe way to certify that pipeline was 'leak tight'.

In order to internally inspect the pipeline, several important steps were taken to:

- Determine the 'piggability' of the line.
- Identify operational considerations to ensure an effective pigging operation.
- Establish special conditions (unique to that pipeline) that needed to be accounted for.

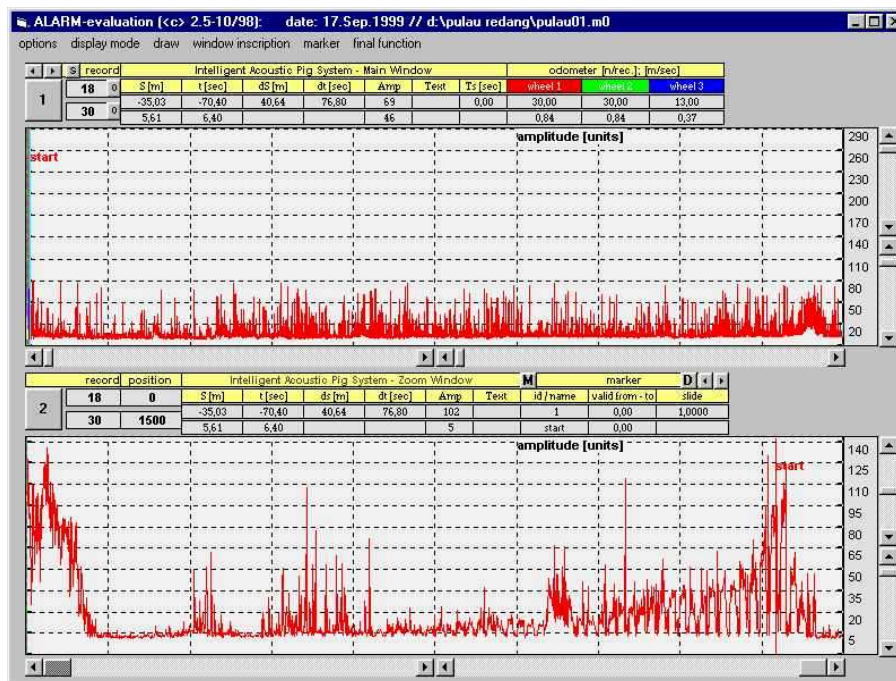
These were considered for this survey and resulted in the following stages to the project.

The pre-inspection work included the design, supply and operation of swabbing and 'dummy' gauging pigs.



## The Results and Benefits

The HEARLEAK tool was then run and took 14.5 hours to survey the 27.3 km pipeline, travelling at an average speed of 0.5 m/s (which was within the target speed for the tool to assure a pre-agreed level of leak detection accuracy). Analysis at the data was also carried out on-site, giving the customer immediate feedback. This is important in cases where leaks are found, as a further survey may then be required to confirm the results. In this survey no leaks were found and Babena was advised verbally of the results of the analysis and issued a certificate shortly after. An example of the signals analysed is presented in the figure below and shows (in the lower window) the responses from the tool when it was just being launched (while the pipes are above ground) and gives the response (on the right) of an acoustic 'pinger' that was mounted on the pipe to 'mark' the position of the pig in the line. Detailed inspection of the data from the rest of the survey gave no indications of leaks in the pipeline.



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