Citation for published version:

Publication date:
2014

Document Version
Early version, also known as pre-print

Link to publication

University of Bath

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A limited region electrical capacitance tomography for detection of wax deposits and scales in pipelines
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ABSTRACT
Pipelines are very critical infrastructures allowing flow of many essential components in modern lives. The deposition of scales and waxes can create problems in many industrial flows. Examples are in scale formation on crude oil pipelines. For crude oil pipelines a chemical removal method is used for cleaning of the deposits in aboveground pipelines and a pigging method is used for underground and subsea pipelines. Deposition of scales is a major source of malfunctioning of the pipeline and the downtime of cleaning process can be very costly. In this paper we present a high resolution limited region electrical capacitance tomography (ECT) for reconstruction of deposits in the interior of plastic pipes. ECT provides an early detection of level of scaling and deposits in pipelines using non-invasive capacitive measurements. In our proposed method a simple limited region tomography algorithm is developed enhancing the ECT imaging resolution allowing for detection of low level depositions. The experimental results are shown in figure 1. Further laboratory experimental data will be used to evaluate smallest level of deposit that can be detected.

Figure 1: pipeline wax deposition inspection with 12 electrodes ECT data

Keywords: ECT, pipeline deposit monitoring, limited region tomography

REFERENCES